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DYNAMIC PSYCHOLOGY AND THE PROBLEM OF MOTIVATION

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There is undoubtedly a strong trend today towards a more dynamic psychology, one which will explain the 'particular go' of the mental machine, which will tell us *why* our minds act in certain ways and *how* rather than of *what* they are made. Three aspects of the general problem of motivation—which is central to any dynamic psychology—must be distinguished, if we are to reach clearness, though the three aspects in fact overlap. To continue the analogy of the machine—and this is at least a valid metaphor—we must distinguish first the mechanism of psycho-motor action, second its driving power, and third the end aimed at or motive in the narrower sense.[1]

Modern empirical psychology, which we may date somewhat arbitrarily from Hobbes, has been dominated by the hedonistic theory. Man is actuated or motivated chiefly or wholly by the desire for pleasure and the aversion from pain. Pleasure-pain is thus held to be both the driving force and the end aimed at, that is the motive. Hedonism as an ethical theory has a certain plausibility. Nevertheless it early met staunch opposition. As a psychological theory it is entirely inadequate, yet it remained up to the middle of the last century almost unchallenged. It was the uncritically accepted doctrine of hedonism which enabled psychology to go its even pace, untroubled by the problem of motives at all.

[1] Motive is sometimes used to include the second factor as well, or as a synonym for motivation in the wider sense we have given it here. The dictionary definition of motive as 'that which induces one to act' seems to me preferable.

The successful refutation of hedonism in the last century left a void in psychological theory disturbing to the complacency of even the most hardened. James, whom no one would dream of including in this class, made a valiant effort to supply the deficiency with his theory of ideo-motor action. This theory holds that every presentation or idea in its widest sense tends to run over into a motor response. It is impossible with our present knowledge of the nervous system to doubt this. It is the basic fact when we come to consider the mechanism of motivation. But James attempts to elevate this into a theory of will. All that you have to do to will, he tells us, is to hold an idea firmly before the mind. And having done this, the inherently impulsive nature of ideas will take care of the rest. Quite so; but how and why we are to hold certain ideas before the mind, we are not told. That James felt the inadequacy of his own doctrine, I cannot doubt. For one thing, he somewhat overprotests that this is all there is to it in the theory of will.[1] But as a solution of the specific problem of motives he has only the word interest to offer. We keep an idea before the mind in willing because it interests us.

Although he never worked it out in detail, James had a more satisfactory solution to the second problem of motivation. The driving power of conduct comes from our instinctive endowment. This is the thesis so powerfully set forth and defended by William McDougall. "We may say, then, that directly or indirectly the instincts are the prime movers of all human activity; by the conative or impulsive force of some instinct (or of some habit derived from an instinct), every train of thought, however cold and passionless it may seem, is borne along towards its end, and every bodily activity is initiated and sustained. The instinctive impulses determine the ends of all activities and supply the driving power by which all mental activities are sustained; and all the complex intellectual apparatus of the most highly de-

[1] It is unnecessary to deal here with James's second theory of will as the *fiat*. For the *fiat* comes in only when there is a conflict of motives. Until we have settled what these are, we cannot usefully consider their conflict and its resolution.

veloped mind is but a means towards these ends, is but the instrument by which these impulses seek their satisfactions, while pleasure and pain do but serve to guide them in their choice of the means." [1]

It will be observed at once, however, that McDougall here goes somewhat further than James. Our instincts not only furnish us with the *vis a tergo* of action; they also supply the *vis a termino*. Willed action is but the striving after the desired, and the desired is defined completely as the end towards which instinctive action tends, or as that which furthers such action. In his consideration of 'Motives in the Light of Recent Discussion,'[2] Mr. McDougall has lately reaffirmed his belief in the essential correctness of this view. The view earlier expressed which allowed a sort of secondary motivating function to habits, is now, however, given up. The emotions, that is the affective aspect of instinct, alone constitute our motives.[3]

The resultant simplification of the whole doctrine of motivation is most grateful. Why do I act thus and so? Because some instinct has been aroused by the circumstances in which I find myself. My impulsive action and no less my willed action is the result of innate determination. But when we compare this simplicity with the complexity of the motives which we feel to be actuating us, it seems somehow unreal.[4] I do not feel myself actuated at every turn of the day in my choices and behavior by some impelling instinctive drive. Occasionally, often as an excuse, I say that I did something 'instinctively,' but some of my choices are guided by "reason," others by habit, comparatively few are obviously dictated by instinct. From a surface consideration, therefore, it would appear that the simplicity of McDougall's

[1] 'Introduction to Social Psychology,' 1910, 3d Edition, p. 44.

[2] In *Mind*, 1920, **29**, 277–293.

[3] Mr. McDougall doubtless means to include the more generalized instinctive tendencies and affections as well as the appetites. These are all described along with the emotions as contributing to desire in the Supplementary Chapter II of 'Social Psychology.'

[4] He does not offer us anything so absolutely *simple* as the Freudians, however, with their reduction of all activity to the sex motive. But McDougall's thought, even when he is theorizing, is still influenced by empirical considerations.

latest view is attained at the expense of certain facts. But although it thus stands in need of supplement, his viewpoint seems to the present writer not only valuable, but fundamental, to any tenable theory of motivation.

Perhaps if we consider first McDougall's rejection of pleasure-pain as a motive force, the type of corrective needed will be evident. "None of the doctrines of the associationist psychology was more profoundly misleading and led to greater absurdities than the attempt to exhibit pleasure and pain as the source of all activities. . . . Pleasure and pain are not in themselves springs of action, but at the most of undirected movements; they serve rather to modify instinctive processes."[1] But this is to pour out the baby with the bath. Certainly pleasure and pain, or liking and disliking as the writer prefers to call them, are not originally springs of action. Certainly liking is secondary to the satisfaction of some instinct. But hedonism could scarcely have attained such almost universal acceptance were it not true that men are, not merely occasionally, but frequently, actuated by the desire for some anticipated pleasure—*i.e.*, for a pleasurably tinged experience. Even though such experience could be attained only through the satisfaction of some instinctive tendency, it remains true in many particular instances that the dominating factor determining conduct is the desire for pleasure. Pleasure becomes not *the* good, as the hedonist falsely held, but a good for even the most ascetic.

It may be said that what one desires or wills is not pleasure but some pleasant thing, and that the pleasantness of this thing is due to its satisfaction of some instinct. Now pleasure is undoubtedly an abstraction, and we may doubt whether we can directly will an abstraction. Thus one's actual volition must be directed towards some specific action. But such action is distinctly a means to an end and the end in such cases is defined by the person's desire for pleasure, quite abstractly conceived. To deny this is to deny all function to general abstract ideas, to deny that they too are genuine ideas, the impulsive nature of which is the fundamental

[1] *Op. cit.*, p. 43, note.

thesis of the ideo-motor theory. Thus we seem forced to admit pleasure and pain (or liking and disliking) to the position of actual motives, though we may grant with McDougall that the driving force behind them comes from an instinctive disposition.

First then among the secondary or derived motivating forces of human conduct we may put the desire for pleasure. Are there any others? Habit at once suggests itself. Take the classic instance of the absent-minded professor who goes to his room to dress for dinner and actually undresses and goes peacefully to bed. Can we deny that here the 'drive' to use Woodworth's neat expression, is the force—the very expression is significant—of habit? Habitual dispositions as truly as instinctive furnish us driving power for action. To be sure, the energy of habit is rather potential and requires to be 'touched off' by the perception of some familiar situation; but precisely the same thing is true of the instincts. The human machine may be able consciously to determine its ends, but no more than any other machine is it equipped with a genuine self-starter. (What an absurd misnomer a 'self-starting automobile' is, and who would want one if it were possible?)

But habits also furnish us with motives in the narrower sense. It is a curious fact that McDougall who first called explicit attention to the affective (emotional) side of instinct should have overlooked it in connection with habitual conduct. Habit, to be sure, is used primarily to indicate movements—as is instinct too for that matter—and when that motor side is highly developed we call it skill. Now so long as we fix our attention upon this motor aspect, we may not hope to find any 'intrinsic drive' or motive. For the driving power of man is part of his affective equipment. But habits are more than mere skill. Habits are, like instincts, complex psychophysical dispositions, generally if not always including a cognitive, an affective, and a conative aspect. Indeed substituting 'acquired through repetition' for 'inherited or innate,' McDougall's well-known definition of instinct de-

scribes very well the nature of habit.[1] The cognitive aspect of such a disposition closely corresponds to the Herbartian 'apperceptive mass,' while the affective aspect may best be termed interest.

Since this doctrine of habit is somewhat new, it may be well to dwell upon it for a moment. There is a growing tendency to place interest definitely as a feeling. Drever argues, for example, that interest is the affective aspect of the instincts and that the emotions described by McDougall form only a special case. Woodworth calls the feeling that comes from innate capacities, interest. And we have noted that James uses this term as the keyword of his theory of will for that by which the idea is held in mind. On the other hand, the historic association of interest is with attention and with Herbart's 'apperception.' The suggestion here made combines the two uses. Stripped of its mythological elements, the Herbartian doctrine of apperception states that we have a psycho-physical disposition, acquired in experience, predisposing us to the attentive perception of certain kinds of objects; and the perception of such objects is tinged with an affective warmth which is called interest. When some of the functional psychologists, who were much influenced by the Herbartian tradition in education, pointed out the close relation of such a disposition to action, the parallel with instinctive disposition as later defined by McDougall was complete.

But our interests, theoretical or practical, in some one aspect or other of this psycho-physical disposition, constantly tend to obscure the essential unity of the conscious act or process of which it is the ground. Intellectualists speak as if man were exclusively a cognitive being. The functionalists, and more lately and more rabidly, the behaviorists, see in him merely a conative or acting being. Other anti-intellectualists follow McDougall or Freud in regarding man

[1] "We may, then, define an instinct as an inherited or innate psycho-physical disposition which determines its possessor to perceive, and to pay attention to, objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner, or, at least, to experience an impulse to such action." *Op. cit.*, p. 29.

as primarily a feeling, emotional animal. Traditional systematic psychology, to which we might legitimately look for a corrective, has indeed seen that man thinks, feels, acts; but the treatment of each of these aspects has been, with few exceptions, so atomistic that one scarcely glimpses the fact that the separation of these functions is artificial, that they are merely aspects of a single, unified and essentially indivisible conscious act. The more or less permanent ground for such an act we call a disposition. One or other aspect of such a disposition may be to the fore at any given time; perhaps, in limiting cases, the other two manifestations do not show themselves at all. If the affective aspect be prominent, we are apt to speak of it as a sentiment, or as an emotion; if the cognitive is to the fore, we speak of perception, imagination, or thought; if the movements are the significant factor, we speak of instinct, habit or will or outer volition.[1] Where we are dealing with a disposition whose organization as a unit is inherited, we call it instinctive; no single term seems to cover all the manifestations of acquired dispositions. Habit, as emphasizing the repetition involved in its acquisition and the resulting facilitation of action, seems as well suited as any other. Let the name pass, the reality of such dispositional action is scarcely to be doubted.

Now no one doubts that such acquired or habitual dispositions are developed by a continuous genetic process from the innate propensities. (On the other hand, it is at least plausible that it is the attachment of emotions to acquired dispositions which so long obscured their instinctive origin.) But whatever the genetic relation to the instincts, the affective aspect of such an acquired disposition constitutes a motive which is genuinely intrinsic, independent of any drive outside of itself. The writer has had frequent occasion to observe the extreme emotional value for his young son of the habitual regime. Unless the black cast-iron dog with the yellow eyes sits in the upper right hand corner of his tray, his food has no savor and cannot be eaten. When mother and father to-

[1] Will is also used of course to denote a type of experience in which movements are not prominent—*i.e.*, in 'inner volition.'

gether take him for a ride, it is highly improper and not to be tolerated that mother should push him for even the briefest moment, though she may do so when alone with him. And how is it to be expected that he should hold father's left hand in walking, when he has always been accustomed to toddle along on the right? We need not go to the child; a pleasant little essay recently published in the *Atlantic* is full of examples of cherished customs. "No matter how common-place the origin, any simple, unvarying custom, followed for a long time, gathers power to stir the imagination."[1] Mr. McDougall challenges us to produce a single instance of the intrinsic drive of any motor habit. Let him alter any deeply rooted habit and see if there be no disturbance. The intrinsic drive of a habit comes out more sharply in the negative instance because of that retrogression into the subconscious which is the nemesis of all repeated experiences, whether their basis be instinctive or acquired.

As McDougall points out in his review of Woodworth, who puts forward a view somewhat similar to the thesis of this paper, there is nothing in all this inconsistent with the position taken in his 'Social Psychology.' There the interest is primarily genetic. As a geneticist, Mr. McDougall sees that the innate dispositions are fundamental to motives, and for his purpose that is enough. Unfortunately he sometimes speaks as if a careful analysis of actual motivation would disclose this origin, as if our concrete motives always bore upon their face the stamp of their instinctive origin. Often as this may be the case, it more often is not the case; else had there been no need for that exposition of the instinctive nature of motivation which we owe to him. Undoubtedly the social psychologist and the social scientist should be more interested in those dispositions which are common to the race (and these are always innately organized); since it is in these that he will find those springs of action which have moulded institutions and customs.

I do not mean, therefore, to belittle the importance of the contribution of the geneticist. That contribution consists,

[1] 'The Lasting Things.' *The Atlantic Monthly*, April, 1921, pp. 470–475.

firstly, in the emphasis upon the instinctive motives as actual immediate determinants of conduct. It is distinctly worth while to realize how much of our behavior is regulated by the same instinctive motives and motive forces as govern our fellows, not merely of our own nation and time, but of all men since man first was man.

Even more important is the recognition of a certain resistance in these inherited springs of action. The proponent of social control may be assured that the acquired motives and impulses can be, if necessary, remade. For all that is distinctive and individual in the acquired motives is due to their form of integration from the simple innate drives, and what can be thus put together can be disintegrated. Not so the innate springs of action. As Dewey says, our instincts give us a bias so strong that we cannot go contrary to them, though by trying we may pervert, stunt and corrupt them. The worldwide industrial unrest is being recognized as the result of the tremenduous repression of instinctive wants and desires, and their diversion into abnormal channels.[1]

Yet it is just here that it is important to recognize the reality of acquired motivations. The instinctive tendencies are limiting, even to a certain extent normative, to the acquired forms of motivation and to all schemes of social control based on them. But without these acquired motivations, the only alternative to repression is unbridled license for all our instincts. The judicious control of our motives, in the individual by habits and in society by custom, is the prime necessity for social life. The easy and dogmatic appeal to 'human nature' in support of this or that form of social organization must give way to a study of the manifold ways in which particular structures, satisfying certain instinctive demands while perhaps repressing others, are built up and supported by acquired motivations. It is only by taking due account of the effects of both heredity and experience that we can do justice to the variety of human life.

[1] Compare, *e.g.*, Carleton Parker, 'Motives in Economic Life,' *Proc. Amer. Sociol. Soc.*, 1918, 12, 131.

Conclusion

The plea, then, is for a broader theory of motivation than hedonism or the instinct theory recently formulated by McDougall. We must seek the dynamics of human behavior not merely in the innate mechanisms but in any relatively permanent psycho-physical disposition. The habit-dispositions, whose importance is thus emphasized, are to be thought of as parallel to the instinctive. Like these they give rise to a unitary psycho-motor response in which we may distinguish a cognitive, a conative, and an affective aspect. As a function primarily of the last, the desired ends of life are but the ends towards which some such disposition—innate or habit-acquired—is directed. This is the stuff of which our conscious motives are made.

PSYCHOLOGY AND THE CENTRAL NERVOUS SYSTEM

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The Province of Psychology.—In recent psychological literature we find two radically different conceptions of the science. (1) The older view, still widely prevalent, considers its chief task to be the examination of 'mental states,' 'states of consciousness,' or 'conscious experiences' of organic beings. (2) The newer conception, only recently developed in a systematic way, regards the science chiefly as an investigation of the 'behavior' or 'responses' of organisms to stimuli from without.

These two conceptions differ so widely that they are generally regarded as irreconcilable—they appear to psychologists and outsiders alike to represent two different fields of investigations. There is, in fact, considerable doubt on the part of each group of investigators as to whether the researches of the other properly belong within the pale. The investigators of conscious phenomena—the Introspectionists—question whether the study of mere motor expression is a legitimate concern of psychology; on the other hand the Behaviorists question whether introspective studies, however interesting, are legitimate objects of science.

To the present writer this mutual challenge between two sets of investigators in what is apparently a single field of 'natural phenomena,' seems to indicate that neither party has attained a sufficiently broad conception of the system of events which both are endeavoring to investigate.

If we lay aside our traditional prejudices and the bias attaching to the terms 'psychology' and 'behavior,' we cannot but admit the close relation between the events studied by the two groups. Both 'conscious experiences' and manifestations of 'behavior' are phenomena of *organic creatures.*

And further, except in the lowest creatures, they are intimately associated with the operations of the *nervous system.* If, then, 'mental states' and 'expressions of behavior' admit of scientific investigation—or to the extent that such investigation is possible—they appear to belong to the same general field of science. Behavior is not merely a branch of physiology; its data, *responses*, are a class of phenomena indicative of neural activity. Mental states or experiences are not merely subjective occurrences; they are somehow conditioned on the operations of the nervous system.

A balanced view of the field of psychology, then, would seem to make its central feature the *specific activity of the nervous system.*[1] Behavior may be regarded as the end-result of neural activity, and the conscious experiences which the introspectionists investigate are in some way 'bound up' with this same neural activity.

Furthermore, the really significant portion of the nervous system is not the conducting segments of its arcs but the *central* regions. This is definitely recognized by the introspectionists. The 'orthodox' psychology of today assumes a connection of some sort between the phenomena of consciousness and activity in the brain—more specifically, activity of the cortex. The behaviorists regard the muscular and glandular phenomena which they investigate as due to efferent neural activity from the centers. Their conception is the broader one, for they do not limit these centers to the cortex, but include any or all central points, whether in the cortex, lower brain, or cord (and possibly in the autonomic system). While this difference between the two schools is significant, its importance may easily be over-emphasized. The two have at least this in common, that they attach relatively slight importance to the afferent and efferent conduction paths, and agree that the main function of the

[1] This and the two preceding statements should of course be qualified so as to include the simple phenomena occurring in protozoa, which have no nervous system or 'neural activity' properly speaking. In these creatures an equivalent mode of activity is observed, though its structural basis is far less definitely organized. The term *specific* in the definition is intended to exclude the trophic phenomena of the nerve cells, with which psychology is not directly concerned.

nervous system is the integration of incoming impulses and the coordination of outgoing impulses—both of which occur at the centers.

Finally, both schools recognize the significance of the special organs at the two ends of the nervous arc. The receptor organs are stimulated by the environment, the effector organs give rise to responsive activity of one sort or another—muscular or glandular.

History has shown time and again that a science becomes more fruitful as it oversteps the bounds of 'classification' and becomes 'dynamic.' In biology, genetic problems have proved far more significant than the mere description and classification of animals and plants. So in psychology, the conception of 'adaptive responses' seems more significant than mere classifications of 'mental states' or 'types of response.'

The writer believes that the most appropriate and fruitful conception of psychology is to regard it as the branch which investigates all the phenomena directly concerned in organic stimulation, central adjustment, and response. More explicitly, psychology is the branch which deals with stimulation of organisms by their environment, central nervous activity resulting therefrom, and responsive activity of whatever sort consequent on this central activity. Responsive activity includes not merely glandular secretion and muscular contraction, but all the bodily changes and movements which result therefrom. All these taken together constitute in any given instance the creature's response to a specific stimulus or to the entire group of stimuli which make up the 'total situation.' The notion of *adaptiveness* is by no means implied in the definition; it is a matter for investigation to determine how far a creature's responses are suited to the situation and by what means they tend to become adaptive.[1]

The question at once arises whether such a conception of psychology really helps to bring the two lines of investigation together. Does it tend to unify the science, or does it merely

[1] The term *adaptation*, fitness of result, is not to be confused with *adjustment*, the linking up of sensory and motor impulses.

add a third alternative to the existing diversity? This standpoint, which has been developed by the writer,[1] has been identified with behaviorism by intropectionists,[2] but the behaviorists will have none of its 'introspective' features.[3] While this indicates that the standpoint offers a possible neutral meeting ground, it also shows that the conception has not been developed with satisfactory clearness. It may accordingly be worth while to examine the 'neurological standpoint' of psychology more fully and try to reconcile it with the introspective and behavior standpoints.

Central Nervous Activity and Consciousness.—The chief difficulty in attempting to bring psychology into line with the biological sciences lies in the traditional conception of 'mind' and 'consciousness.' Both of the historic views—Interactionism and Parallelism—while they differ radically from each other, regard mental phenomena as belonging to an essentially different order from neural phenomena. In either case there results a duplicate set of events, whose mutual relations are not made clear in any statement with which the writer is familiar. Psychophysical parallelism as a theory expressly refuses to put forward an hypothesis respecting the mode of relation. Interactionism admits a very definite relationship, but not of a sort that is of service to scientific research. Let us examine the latter hypothesis.

According to the interaction view, mind and the neural protoplasm of the brain are two different substances, capable of affecting one another. This is reasonable enough. When an incoming nerve impulse reaches certain regions in the *brain* it thereupon arouses a sensation or 'awareness' in the *mind.* A reasonable corollary. But what next? Does the mind thereupon, independently of brain activity, form an idea, a purpose-to-act, and a volition? Or does the nerve impulse pass from the sensory center to a higher center and *there* arouse an idea in the mind? What becomes of the nerve impulse while the purpose-to-act is forming, and how is the nerve impulse modified by the volition?

[1] 'Human Psychology,' 1919.

[2] See M. W. Calkins, PSYCHOL. REV., 1921, **28**, 1–18.

[3] This I gather from comments in private letters and personally.

In a recent article[1] Professor M. W. Calkins suggests that the writer's chief objection to the interaction view is a fear that it may lead inevitably to indeterminism. This is by no means the chief objection to the view. For even if we can surmount this difficulty, as Miss Calkins believes we can, are we not assuming a *double set of machinery* to accomplish what a single set would accomplish equally well? If the complex nerve impulses, following the paths of least resistance, bring about certain motor activities, how does it assist our explanation to say that the *will* (a mental state or power) causes the movement by operating upon this nerve impulse? [2]

Since the days of Occam, science has recognized the importance of cutting out a multiplicity of causes. Here is apparently a case in point. Experiment indicates that the specific motor effects of psychocerebral processes are determined by the line of neural least resistance rather than by the conscious volition. If I select some act never before performed, and 'will' to do it, the mental determination has no result. I can determine to twitch my ears and can will to perform the act time and again—but no activity of the sort occurs. The nerve impulse does not follow the direction suggested by the will; it follows the path of least neural resistance.

Professor E. L. Thorndike some years ago[3] pointed out the fundamental error in the traditional ideomotor theory. According to that theory the thought of a movement tends to produce that movement. Observation and experiment, according to Thorndike, demonstrate that this view is erroneous. Granted that an idea (or its neural correlate) always tends to motor expression of *some* sort, there is no evidence that this expression will *in the beginning* tend to correspond to the idea. Only by chance variation, selection,

[1] PSYCHOL. REV., 1921, **28**, p. 12.

[2] Dr. J. R. Kantor characterizes this view as assuming 'a mystic potency resident in consciousness' (PSYCHOL. REV., 1920, **27**, p. 202). Ignoring the adjective, is the will really a *potency?*

[3] 'Ideomotor Action,' PSYCHOL. REV., 1913, **20**, 91–106; cf. H. C. Warren, 'The Mental and the Physical,' PSYCHOL. REV., 1914, **21**, 79–100.

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and learning does an idea or a volition come to express itself in the appropriate way. If I chance to hit upon the proper efferent path to the ear muscle, and by selection and repetition fix that path, then in time the idea of twitching the ear will be followed by the actual movement as naturally and as certainly as in the case of any other voluntary movement. But if this is the case, then why attribute causal significance to the thought rather than to the neural correlate? Are we not assuming a duplicate set of 'agencies' to explain what may be explained quite as fully in terms of the neural correlate alone?

The reason why this dualistic explanation is so commonly accepted seems to be that psychologists are not accustomed to interpret mental phenomena in neural terms. The introspectionist observes that when a book lies on the table and stimulates his visual receptor organ he *thinks* of picking up the book and the proper movement then follows. His technical description includes the stages of *perceiving* the book, *deciding* (or willing) to grasp it, and making the appropriate *muscular contraction.* But we know that the perception part of the process is preceded by an afferent nerve impulse, for if the optic nerve be severed the perception does not occur. We know also that the later stages are accompanied by certain characteristic neural operations, for if the brain be disturbed in certain ways the idea, or the decision, or the muscular contraction (one or all) do not occur.

Normal and pathological investigation indicate, then, that the specific activity of the nervous system is highly significant at every stage of the process. We have no differential evidence to show whether or not 'consciousness' apart from the neural correlate is significant—whether its activity makes the result different from what the nerve impulses by themselves would accomplish.

This examination will indicate why the so-called 'double-aspect' interpretation appears a more useful working hypothesis for psychological investigation than the 'interaction' interpretation. According to the two-aspect view the 'neural correlate' is not a correlate at all; it is the *same set of events*

observed in a different manner. The book-stimuli excite certain optic-nerve impulses which are conveyed to the brain; an integrative process occurs in the cortical centers. This cortex is part of my body. I am somehow identified with this particular brain, in a sense that I am not identified with the brains of other organisms. Is it a far-fetched hypothesis to assume that my mental life, my consciousness, *consists of* the neural activities in this particular brain? That the events which are observed (so far as they *are* observed) by the neurologist in the form of neural impulses, integrations, etc., are the same events which I, the personality of this organism, observe in the form of perceptions and other experiences? That there is actually but one set of primary occurrences concerned, which may be observed either *objectively*, by means of apparatus registering the nerve impulses, or *subjectively*, by living these events—by experiencing them as part of myself?

Various objections have been raised to the double-aspect hypothesis, which so far as they are not based on mere misunderstanding or faulty logic seem reducible to two: (1) The two sets of phenomena are so absolutely different that it is difficult to conceive how they can be regarded as two manifestations of the same set of events. (2) Even admitting the possibility of this unification it is of no scientific value, since the 'conscious' aspect has no causal significance.

(1) The force of the first objection is readily admitted. I cannot picture a neural process as a perception, nor can I picture a perception as consisting of an intricate synthesis of neural activities. But does this at once condemn the hypothesis? I find it just as difficult to picture the relation of two separate interacting substances in any satisfactory way; and the parallel changes of two independent substances is quite as unthinkable. We are concerned here with one of the *ultimate facts* of the universe, and it is not to be expected that a satisfactory mental picture of the relation in question can be obtained in the present stage of investigation. Mere unthinkability or unpicturability[1] is not sufficient

[1] Philosophers appear to lay too much stress on this criterion. If an hypothesis accounts for the facts, what matters it whether we can 'picture' their relations or not?

ground for rejection so long as the other alternatives are equally unthinkable. Our choice of an hypothesis is to be governed by its utility in explaining the observed phenomena.[1]

(2) This brings us to the second objection. Has the double-aspect hypothesis no scientific value? On the contrary I believe it to be the most promising means of attacking psychological problems. Granting that perception, volition, and other subjective experiences have no *independent* causal significance in modifying the neural operations, they do furnish first-hand information as to what those processes really are. For example, the fact that one perceives a book as a unitary object indicates (if our hypothesis be adopted) that the separate nerve impulses from various parts of the retina are unified in some way. The fusion of two sounds into a complex auditory sensation indicates a different sort of composition of the neural impulses in auditory phenomena from that which occurs in the visual. Attention, the focalizing of certain parts of an experience with 'marginalizing' of the other parts, indicates some specific characteristic of the neural process.

Contrast this with the parallelistic hypothesis. Parallelism assumes as psychological data an absolutely detached set of phenomena—mental states, or operations—which throw no light whatever on the nature of neural activity. On this hypothesis we can indeed build up an introspective science of experience, but we may not use it in developing our explanation of the stimulus-response process. Parallelism is fruitful only so far as it goes over into a 'monism' of the double-aspect type. The more the two sets of *phenomena* are reduced to a single set of *primary occurrences*, the more unitary does psychology become.

Here we may appeal again to our scientific canon of simplicity or paucity of agencies. It is not only more fruitful, it is more justifiable on general scientific principles, to assume a single set of events manifesting themselves in two

[1] Whichever view is adopted is taken merely as a working-hypothesis. The writer shares Miss Calkins's objection to introducing 'metaphysical theories' into psychology (*op. cit.*, p. 12); but how can we avoid taking a tentative attitude on this particular problem?

sets of phenomena—'objective' neural processes and 'subjective' experiences[1]—than to assume two independently working, yet harmonious sets of events.

Central Nervous Activity and Behavior.—The behavior method of investigating psychological phenomena has a distinct advantage over self-observation as a scientific procedure; it permits quantitative measurement of the phenomena under consideration in terms of well-known physical standards. The older form of introspection gave only qualitative results and rough numerical approximations.[2] Experimental psychophysical investigations, which subject introspection to laboratory conditions, are exact and quantitative only in so far as they include behavior factors. The duration of the perception and recognition processes are measured by means of reaction time—that is, response time. Discrimination (just noticeable difference) is either measured with the aid of some muscular response—separating the lighter from the heavier, stopping the changes of a variable stimulus, etc.—or it is indicated by some verbal response, such as 'now,' 'equal,' 'stop.'

The behaviorists very properly lay stress on the fact that *some* responsive activity is always requisite before the 'introspective data' can be used. From this fact they draw the illogical deduction that recognition and discrimination themselves are types of behavior. When I lift certain pairs of weights and place the heavier each time at the right, the discrimination process (they say) is the *act* of placing the weights in this order; when I report by such words as 'greater,' 'now,' etc., the discrimination is the *act* of verbal response.

In a recent article[3] Dr. J. R. Kantor seeks to explain perception in strictly behavioristic terms. "Perception," he says, "is the conscious behavior through which are developed the meanings of objects and relations which operate in the adaptation of the individual to his surroundings and in the

[1] Consciousness, according to this view, is merely a name for the specific characteristic of subjective experiences.

[2] *E.g.*, the number of different color-hues, auditory tones, etc.

[3] 'Suggestions toward a Scientific Interpretation of Perception,' PSYCHOL. REV., 1920, **27**, 191–216.

control of them. The act of perception is an adjustmental reaction, an actual interaction of one object with another." [1] According to his view the act of perceiving is a motor process —not an occurrence in the central nervous system.

Further, the behaviorists assert that memory, 'imagery' of every sort, and thought itself are motor in character. When I think, the process consists in very faint vocal expressions or in vocal attitudes. So-called imagery consists in minute responses which reproduce faint stimuli and thereby reinstate minute sensations similar to the previous sensation, though far lesser in degree.

There is surely a logical fallacy in this assumption. Granting that the central nerve activity is always followed at once by a motor impulse and response of some sort, it does not follow that such responses are the *essential feature* of the perceptual, discriminative, and imaging processes. They may be merely by-products.

The degree of heat in a room is indicated by the height of mercury in a thermometer bulb. But the rise and fall of the mercury column is not the essential or characteristic feature of the heat phenomenon. So long as the thermometer is present it enables us to measure accurately the degree of heat. But if the thermometer be destroyed by some accident, the heat variations still continue, though we may be unable to measure them.[2] In the absence of crucial evidence we are only justified in regarding behavior phenomena (general and vocal) as *indicative* of certain central phenomena. Motor expression *follows* the central nervous operations known as perception, discrimination, thought, etc.; it may serve as a measure of these central operations; but until the exact relations of the motor to the central phenomena have been determined we are not justified in treating the two as equivalent—we are not warranted in identifying the central phenomena of discrimination and thought with the response phenomena which they produce. When the behaviorist

[1] *Op. cit.*, p. 192.

[2] To vary the illustration, the earth's magnetic current is active whether or not we observe it with a compass.

makes this substitution he is guilty of the 'thermometer fallacy.'

It should be noted that this criticism is directed merely against the *line of argument* used by the behaviorists; it does not claim to demonstrate that the behavior data are *not* adequate indicators of the central processes. That is a matter to be settled by crucial experiments. The behaviorists do indeed point to certain very significant evidence. With delicate apparatus for measuring the changes in the vocal organs, for example, it is found that 'silent reading' is accompanied by minute but significant vocal expressions. 'Attention' is accompanied by minute muscular changes. The automatograph registers slight hand movements in cases of 'silent thinking.'

Is this evidence crucial? I believe not. According to Mill the canon of Agreement by itself is not sufficient proof; it is convincing only when combined with the canon of Difference. We can conclude that behavior is essential to thought only if it be shown that in the absence of expression there is no central thought process. One clear case of thought without expression would be enough to render the theory untenable.

I know of no experimental study that furnishes the data requisite for a final decision on this point. But it would seem to be not impossible of solution. Supposing an observer be given a complicated problem to solve, involving a series of rational operations. If thought consists essentially in motor adjustments, then *each step* in solving the problem will require a separate efferent impulse, an attention-response, and an afferent impulse, before the next step can begin. If, on the other hand, thought is essentially an affair of the central nervous system, then each step may consist merely in some complex central activity which is transformed directly into some other central activity *without intermediate behavior.* We know within limits the time required for transmission of nerve impulses along the conducting nerves. If the time for accomplishing a complicated train of reasoning be *so short as to preclude a succession of motor responses and return impulses*, then it would seem evident that the behavior

phenomena are not essential to thought—that thought is essentially a central nervous operation. The experiment seems well worth undertaking. If satisfactory it would either demonstrate the falsity of the behaviorists' contention, or it would furnish fair presumption that their assumption is valid.[1]

In the absence of this crucial evidence I am inclined to reject the behavioristic assumption. Possibly this is due to prejudice, on account of its association with the thermometer fallacy. But there is also a positive reason for emphasizing the central phenomena over and above the expressive. There are instances of pairs or groups of responses which are quite different, yet which are obviously equivalent, where the 'equivalence' can be traced to the central nervous operations.

I write the words 'Next Tuesday' very fine, using only the muscles of the finger joints with slight wrist movements; then I write the same words in eight-inch letters on the blackboard with fingers and wrist perfectly rigid, using only the muscles of the elbow and shoulder. The efferent paths and muscles concerned in the two cases are entirely different; yet the two responses are so homologous that one can readily identify them as the writing of the same individual. (See Fig. 1.) Or, I hammer the words on a typewriter, click them off on a telegraph key, set them up in type, scrawl them stenographically. Here also there is a general equivalence between the various responses, though of a different sort. Or, I utter the words, 'mardi prochain,' 'nächste Dienstag'; these are in a sense equivalent to all the former responses. The psychological relation between these various responses is not brought out by a study of behavior. It is certainly dependent in a measure upon the stimuli, upon the general situation which led to the responses. But the basis of the 'equivalence' between such different responses seems to lie primarily in the central nervous system.[2]

[1] The same test would decide the value of the functionalist assumption that consciousness is determined by the total process, including the motor response. The alternative is to identify consciousness with the receptive and central processes, whether the reaction takes place or not.

[2] Has not too much emphasis been laid on the 'common final path'? Are there not as many cases of a common *initial* path (from the receptors) with different end paths?

What we need especially is a theory of central nervous activity that will explain (1) how two motor currents, going over different groups of paths (*e.g.*, to fingers and to elbow) will bring about movements which are geometrically similar within a very small limit of error; and (2) how motor currents can be sent out producing sets of behavior which are physically

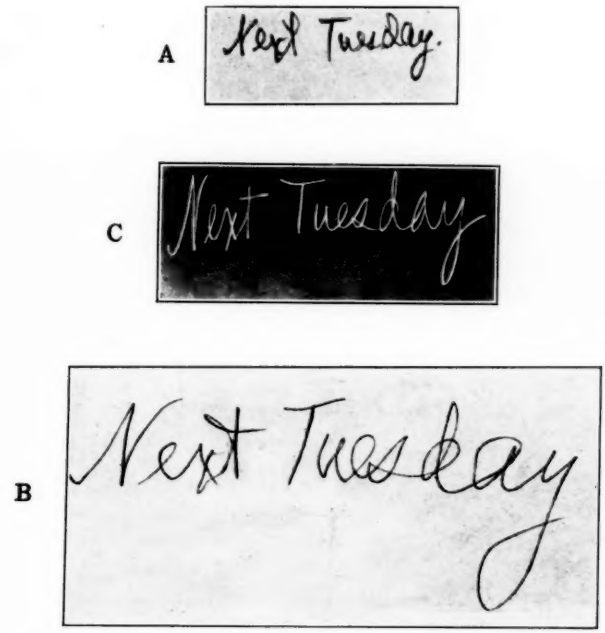

FIG. 1. Handwriting with Different Muscles. *A*. Finger movement only. Height of letters 2/16 + 2/16 + 3/16 = 7/16 inch. *B*. Wrist movement mainly. 3/8 + 4/8 + 8/8 = 15/8 inch. *C*. Elbow and shoulder only. 4 + 4 + 5 = 13 inches; written with chalk on blackboard.

incommensurate with one another (writing, vocalizing in various languages) and yet which have practically the same 'significance.'

It would seem that the behavior method, taken by itself, promises little hope of solving these problems. Behavior undoubtedly gives many clues to the nature of the central

processes but only in connection with 'self-observation' (introspection) and neurological experiment.[1]

Use of Neural Data in Psychology.—It is a striking fact that little psychological information has been obtained by a direct study of neural activity. Psychology rests today almost wholly on investigations of conscious experiences and behavior. We know considerable about the paths of conduction from various receptors and to various effectors. We know somewhat about the centers concerned in connecting up the two ends of the arc. But we know little about the nature of the nerve current.

At least two general problems of nerve physiology are of vital importance to psychology: (1) What variations is the individual nerve impulse capable of undergoing? (2) What is the mechanism of the complex arc, whereby many simple afferent impulses unite into a complex central impulse and whereby a complex impulse results in coordinated motor activity?

The difficulties connected with the direct investigation of these problems are patent. Little can be accomplished by present methods in the way of studying the activity of individual neurons *in situ;* and the study of isolated nerves by artificial stimulation yields results whose validity may be questioned in several particulars. Is the process of electrical stimulation, investigated by physiologists, comparable to the effects produced in the neuron by natural stimulation? One cannot but feel some doubt. For the most part physiological experimentation has been confined to nerve-muscle preparations. Now the nerve certainly acts as an electrical conductor, and the result of electrical stimulation on such a preparation will obviously produce muscular contraction whether the 'current' is analogous or not to the natural nerve impulse. Is there satisfactory evidence that the artificial transmission process in the neuromuscular preparation is analogous to the natural activity of nerve? As a rank outsider

[1] Professor J. B. Watson has done yeoman's service to psychology in forcing the recognition of the behavior method. It is only when he refuses to recognize the legitimacy of other methods of investigation that we part company.

in physiological technique I realize the rashness of offering criticism. But certainly we must not ignore the possibility that the natural nerve impulse may be essentially chemical [1]—that the electrical phenomena may be mere adjuncts. And if this be actually the case, do not some of the physiologists' conclusions call for revision?

1. The specific conclusion which with great diffidence I am inclined to question, is the qualitative uniformity of the nerve impulse.

It is not easy to reconcile the results of introspective psychology with the notion of qualitatively uniform incoming impulses. Certain stimuli (light and sound, for instance) present two independent variations, *intensity* and *quality* (periodicity); the corresponding sensations also show two independent variations, *intensity* and *quality*. It is difficult to understand how external phenomena with two variable factors can give rise to corresponding experiences[2] with two variables unless the nerve impulse also varies in two independent ways.

Working with electric stimuli and electric currents in the nerve, one would expect to discover only intensity variations and not variations of 'sort.' The observation of activity in efferent nerves and muscles affords no opportunity for testing whether the nerve impulses vary in a two-fold way: here we have only the phenomena of contraction and relaxation. But chemical changes offer opportunities for qualitative as well as quantitative variations. Metabolism may result in a variety of chemical products as well as in different degrees of change. If the nerve impulse is essentially a chemical process, it could transmit the two-fold variation to the centers.

2. What is the mechanism of complex coordinated movements? How is the current distributed in the proper proportions and in proper temporal sequence, so as to produce

[1] Some slight metabolism has been found in active nerve.

[2] It seems scarcely necessary to assume with Mr. S. Bent Russell that the central data are *similar* to the stimuli (PSYCHOL. REV., 1920, **27**, 234–245). All we have to account for is a one-to-one relation of intensities and qualities in the two cases.

just the right complex movement? Compare the movements shown in Fig. 1. From the centers the impulse is shunted in a corresponding fashion into two entirely different sets of efferent pathways in the first and third cases. The equivalence of these two results seems to depend on something more than merely the relative tension at the motor synapses. It seems to imply some definite qualitative character of the central impulse itself.[1] In other words, the passage of the impulse over a certain synapse apparently depends not merely on the degree of resistance of that synapse; it would seem to depend also on *whether the particular impulse* (or some phase of it) *is adjusted to the condition of that particular synapse.* The condition of the synapse may be a function of previous impulses and of the *sort* of traces which they have left, if we assume that the nerve impulse is essentially a metabolic activity.

These two problems illustrate the close interconnection between the three different methods of psychological research. The results of the neural method are tested in the first case by the method of self-observation, in the second case by the behavior method. If these three methods of research be recognized as equally legitimate in psychology, it would seem that they might be used to supplement one another in many ways.

One application of this, suggested by the writer,[2] is in the correlation of the fundamental 'operations of conscious experience' with the operations of the neurons. Regarded solely from the standpoint of introspective psychology it is difficult to appreciate the mutual relation of such processes as sensation, revival, attention, discrimination, association. This is shown by the various ways in which they have been treated by different authors. In practically no text are they viewed as a group of coordinate operations. The problem is this: Assuming that mental states (experiences) imply corresponding neural conditions, and that each essentially

[1] The qualitative difference may be due to different chemical changes or to some difference of periodicity. To avoid bias we may call it difference in *mode*.

[2] 'Human Psychology,' ch. V., VIII.; see table, p. 144.

different mental operation means some distinctive neural operation; what is the least number of independent operations that can be noted in the two fields, and how are they correlated? Without contending too strenuously for the sevenfold scheme proposed in 'Human Psychology' the writer would strongly urge the principle on which it is based, namely, of translating the 'introspective' data at each point into terms of neural activity. Conscious revival corresponds to neural retention; attention to metabolic variations, etc.

A result perhaps worth while in itself is that this standpoint differentiates sharply between structural and functional data. There is no tendency to confuse 'mental states' with 'mental operations.' Perception, memory, thought, and the like are not fundamental operations at all; each consists of several operations upon elementary sensory data. Perceiving includes the functions of (*a*) impression, (*b*) combining the data, (*c*) focalizing certain data and marginalizing others. The structural product (a perception) is a synthesis of data derived mainly from the external receptors. And so for the rest of the traditional 'faculties.' The structural distinctions are based upon the stimuli—upon something outside the nervous system; the functional distinctions rest on the different characteristics of neural activity. This at least is the conclusion drawn from combining neurology with self-observation. Neither the interaction nor the parallelistic standpoint enables us to use this combined method of research, on account of their inherent dualism. The double-aspect hypothesis finds it natural to compare the two sets of data and to reduce them to one.[1]

Though little has been done in the way of physiological examination of nerves *in situ*, pathological investigations of neural conditions have borne considerable fruit. Disease and experimental extirpation of nerve substance have done much to identify the regions concerned in neural activity.

[1] Miss Calkins is wrong (*op. cit.*, pp. 9, 10) in interpreting me as holding that the central processes are facts only by inference, and that it is impossible to observe them directly. If we have not succeeded in doing so it is the fault of our instruments. I have never been in Brazil; this does not mean that it is impossible for me to go there.

The afferent and efferent pathways serving various peripheral regions have been traced in the cord and lower brain and many important cortical centers have been identified. The bearing of this localization on psychological problems has been lately discussed by Dr. S. I. Franz.[1] He reaches the conclusion that the higher centers, at least, are not specific to the functions which they serve—that one center is capable of assuming the function of another if the latter be destroyed. This conclusion, based on evidence from cases of reëducation, is important for psychology. It means that central adjustment depends not so much on structure (types of cell) as on process (on connections being actually established). If vocal speech can be relearned when the usual vocal speech area of the cortex has been destroyed, evidently the speech function depends on certain integrations and coordinations—not on the locality or kind of tissue in which the adjustment takes place. We thus reach the picture of a complex central impulse, the same however and wherever integrated, which is the characteristic 'adjustment phenomenon' of any given type of neural activity. According to the double-aspect hypothesis these central impulses are the data of self-observation; they are our experiences.

This line of research will perhaps assist us in explaining the loss of vivid consciousness in connection with habitual acts. As an action becomes learned, it tends to proceed with less and less awareness of its successive stages, till in time it may become quite automatic: we may be entirely unaware of performing it. The common explanation is that in the course of learning the lower centers come to control the act and the higher centers drop out. But if learning is the fixing of certain pathways, then it is difficult to reconcile this fixing of paths with the abandonment of the fixed path for a short-cut. What we do have, however, is an integrated experience —and an integrated central impulse. It may be assumed that as the act is learned the integration becomes more and more complete, and that in the end the impulse goes directly from one higher center into the motor paths, instead of

[1] PSYCHOL. REV., 1921, **28**, 81–95. Dr. Franz favors the parallelistic hypothesis.

passing first through a number of centers, with gradual integration and coordination.

Summary.—The conflict between introspective and behavioristic conceptions of psychology is avoided by emphasizing their common features. Both deal with effects of stimulation upon the nervous system. Introspective psychology studies the *receptive* phase of the process—awareness of the environment. Behavior psychology studies the *responsive* phase—the creature's reactions upon the environment. Introspection (or self-observation) and behavior may thus be regarded as different methods of investigating a certain definite system of facts: the phenomena of stimulation, adjustment, and response by means of the nervous system.

The traditional psychology may be brought into line with this scheme by adopting the double-aspect view. The prevalent conceptions of the mind-body relation, both interactionism and parallelism, are dualistic, and by separating the two sets of phenomena they prevent the unification of the science. The hypothesis urged in this paper is that mental and neural phenomena are merely two manifestations of a single series of events. Its adoption as a working hypothesis is shown to be in accord with our best canons of scientific procedure. It enables us to use self-observation as a method of investigating the central part of the stimulus-response process.

The behavior psychology may be brought into line with this wider view if we recognize that behavior is merely the end-result and that it is essentially determined by operations in the central portion of the nervous arc. Behaviorists are inclined to emphasize the adjustive effects of the motor processes on the total response. They regard thought as consisting of implicit motor expressions, which serve as secondary stimuli and modify the final overt motor response. This assumption is apparently an instance of the 'thermometer fallacy.'

In this paper it is argued that the essential adjustment operations are central. Characteristic responses may be obtained *before* the implicit control responses are effective,

in which case they would be determined solely by central conditions and by the nature of the stimuli. If this be true, then the central process, not the response, is the significant feature of neural activity. Two crucial tests of this were suggested: (1) The similarity or 'equivalence' of pairs of responses involving different motor paths and muscles. (2) The short duration of extended trains of thinking, which seems to preclude intermediate vocal reactions between each pair of successive terms. If the operations in the central portion of the nervous arc are the essential feature of the stimulus-response process, then behavior and introspection are two coordinate methods of psychological investigation. Both seek to study the central processes which adjust the response to the stimulus.

Attention is called to a third method of psychological research—the neurological. The results of physiological research on the nerve impulse are important for psychology, particularly any light which they throw on complex impulses, the nature of neural retention, and synaptic activity. The results of brain research, by artificial excitation of centers, extirpation, and disease, all belong to this neural method of psychological investigation.

We thus find three distinct methods of psychological research: *self-observation*, *behavior*, and *the neurological*. The hope of psychology lies in their cooperation. Self-observation, for instance, may indicate certain features of the neural processes (*e.g.*, retention) which the neural method is backward in discovering. Behavior may reveal certain central phenomena (*e.g.*, subliminal discrimination) which self-observation does not indicate. Neural research may point out certain details (*e.g.*, the hierarchy of brain centers) which neither self-observation nor behavior has brought out.

Briefly, the natural standpoint of psychology is neither introspective nor behavioristic.[1] Psychology is concerned with a certain very extensive field of occurrences, namely,

[1] Nor yet the investigation of 'selves' as Miss Calkins views them. The writer regards the self, or personality, as a developed organization which includes neura structure, experiences, and attitudes.

all phenomena concerned in the interaction between environment and organism that belong to the stimulus-response type. These phenomena constitute a closely related group and form a natural 'brand' of science. The three methods of research are equally legitimate. The attempts of partisans of any one to outlaw the other two are due to lack of perspective. If, as is here contended, the central portion of the nervous arc is most significant in the process, then the fundamental concern of psychology is with the operations of the central nervous system. All three methods throw light on these central operations. Neurology, behavior, and self-observation are all needed for a broad, systematic development of the science.

APPERCEPTIVE ABILITIES

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DEFINITIONS AND DISCUSSION

Is there any justification for the use of the term apperception? Is apperception a mental process to be distinguished from perception, on the one hand, and, on the other, from certain so-called higher mental processes, such as reasoning and foresight?

Reviewing the accepted textbooks on psychology we find that in some the word apperception does not even appear, while in others it is used with a wide divergence of meaning. Briefly: (1) Angell does not use the term, but he discusses perception as a synthetic process, a process of combining the new and the old, whereby form and meaning are given to the new. (2) In Calkins, 'perception as assimilation' is briefly presented. (3) James regards perception, recognition, interpretation, elaboration all as synonymous. No use is made by him of the specific term apperception. (4) Pillsbury says that memory images help to interpret new material; hence the function of perception is 'to see into things.' (5) Titchener, considering apperception, states, "It is a question whether there is any real gain in the introduction of the term," and reaches the conclusion that 'perception' is adequate without the use of 'apperception.' (6) Thorndike does not include it in his 'Elements of Psychology'; he says, "Every act of perception is really an act of association or assimilation."

Turning to some of those who use the term, we find that (1) in Baldwin's dictionary apperception is defined as "the process of attention in so far as it involves interaction between the presentation attended to, on the one hand, and the total preceding conscious content together with performed mental

disposition, on the other." (2) Dewey devotes some pages to the discussion and defines apperception as "that activity of the mind in which the significance is brought out through becoming explicitly conscious of relations involved." (3) Münsterberg says, "A perception in which the relation to other objects predominates is apperception." (4) Stout goes into the matter in great detail; his general position is that understanding, interpreting, identifying, subsuming, all involve apperception, the common feature being that the new presentation develops significance by connecting it with some mental preformation. (5) Wundt uses the term to designate the process by which any content is brought to clear comprehension. (6) Warren in his recent book, 'Human Psychology,' uses the term with an entirely different meaning, giving as an equivalent expression, 'focused perception.' He states that apperception is a phase of the perceptual process whereby certain elements of a situation or certain stimuli from among a group become 'focused' or clear.

Finally, in education the term apperception has been greatly used ever since Herbart laid such stress upon it—here of course it means specifically the interpretation of the new in the light of the old, the process by which new presentations align themselves with old elements, thus forming systems of ideas.

Among the first group of opinions 'perception' involves the idea of assimilation; the perceptive process refers usually to the recognition or identifying of some object, *e.g.*, an orange or a table is perceived when it is recognized as such, possessing all the attributes which previous experience has shown it to possess. The object is then 'perceived' or 'apperceived.' The most common feature of the second group of definitions is the inclusion under the term apperception of the ideas of significance, interpretation, relationship.

Perhaps to differentiate apperception from other mental processes, to try to find any distinctions between it and them, to see what it is *not*, may help to clarify and limit the

meaning. Apperception is not mere recognition or perception of an object or idea, it involves much more the element of relation. Nor is the distinguishing feature merely memory or association, though both must be present to some extent; they, of course, are the prime elements in the perceptual foundations of apperception. Again, though reasoning also may be involved yet there is a distinction; even with reasoning reduced to a minimum apperception may be present. Apperception has in common with reasoning the need for judging which of the elements of a situation are the essential ones, but in apperception there is not necessarily awakening of a full round of associations or known facts.

Although (as we shall see later) sometimes classed as belonging with imagination and invention, apperception does not require invention of any data, for all the data are given; the essential process is that of seeing the relations between supplied data, whether observational or ideational. Nor can it be altogether satisfactorily regarded as a 'combinatory' process, for in combining one may put together anything. One may add 2 and 2, or 2 and anything else, sometimes even with the avowed purpose of producing some ingenious or fanciful result. Indeed, as Warren says, invention is combining phenomena into new forms. Apperception does not do this.

In an interesting paper, 'The Mechanics of Intelligence,' Warren, discussing types of intelligence, speaks of the intelligence required in adjustments to new situations. He analyzes the intelligence involved in the playing of games, citing chess as an example, and says that aside from learning certain principles or moves there is required here the choosing between possibilities, none of which *obviously* outweighs the others, and the determining from move to move what is to be the next procedure.

It seems clear that in so far as each move is decided upon in its relations to the whole plan of procedure, apperception is involved and forms the basis for determining which of the possibilities, apparently equally good, is in reality the best. In this case the apperception concerns itself with the relation-

ship between the immediate situation and the future possibilities. As the game proceeds there is at each move a resizing up of the situation, perhaps a change in plan; the apperceptive process is here constantly in play. So, though in apperception foresight is not always involved, yet, contrariwise, foresight always involves apperception; indeed foresight is a kind of apperception.

To return to a positive statement regarding apperception, we may say that it deals with an immediate situation, in which the main problem is concerned with the relations between two or more elements, present or to be realized. It is the interpretation of two or more features of a situation, each in light of the others. The perception of these features may be readily accomplishable. Reasoning may be more or less involved. The apperceptive process is not as simple as association, the relationships to be grasped are not so much a matter of mechanical habit, they require more thought. And yet they are not so undetermined and new as to require creative imagination. Apperception is in fact the 'sizing up of a situation,' the interpretation of all the aspects, each in the light of the other, a 'seeing into' an immediate situation, however the latter may be presented.

We may illustrate what we have in mind by the Healy[1] Pictorial Completion Test II, in which there are 10 pictures each representing some activity of the same boy. Let us take the picture where the boy is walking to school. There is no single feature in the picture which cannot readily be perceived and understood—the boy is walking along, a fence behind him —he is swinging his books, the strap is loose. A little study of the picture shows that something has probably fallen out of the strap. The reasoning required for the correct solution is also easy. As we see by the preceding picture he had three books. He now has only two books—what is missing? Studied as a problem in reasoning it is absurdly easy, yet as a matter of apperception our experience shows that it is fre-

[1] This test, completed in 1919 and used as part of the performance scale of the Army, is described in the June, 1921, number of the *Journal of Educational Psychology*. Directions for giving and norms are to be found there.

quently misinterpreted. Instead of the missing book, the lunch box or the pencil box may be placed. Sometimes even the dog is inserted in the blank square. The correct solution depends upon sizing up the situation, upon interpreting it in the light of the relationships; it depends upon seeing that some one alternative outweighs another, though not *obviously* so unless the *relationships* are appreciated. Had the boy not started with three books it would be equally as logical to place in the square the lunch box or the pencil box, either one of which might have slipped from the strap.

If our definition of apperception is accepted there can be little doubt of its great importance to the individual in many circumstances of life. The ability to see the relation between things, to interpret a situation sensibly and intelligently is exceedingly necessary and valuable. Apperception is an activity constantly used. It is, as Dewey says, "That activity of the mind in which the *significance* is brought out." It is essential in meeting everyday experiences, in perceiving our relations to other individuals; indeed it is one tremendously important and essentially conditioning aspect of behavior.

Estimating Apperceptive Abilities

What means are available for gauging an individual's apperceptive abilities? Are there any tests specifically designed for this purpose? To what extent do so-called tests for general intelligence measure these capacities, and to what extent are they incidentally measured by other tests commonly in use?

Again first considering the literature on the subject, we find several points of considerable interest made by the formulators of so-called age scales. Terman, in 'The Measurement of Intelligence' says that defining chair, fork and similar words "throws interesting light on the maturity of the child's apperceptive processes." This is hardly in accord with our definition of the term, apperceptive process—the child certainly is not sizing up the situation, seeing the relationship between various aspects when he defines in

terms other than those of use; he knows the percept, probably the concept, chair; how he defines it depends very largely on the stage of his language development and perhaps on how easily he thinks his examiner may be satisfied. It is the method of expression that is the point. Binet, speaking of this test, states that it gives an indication of the child's general notions and of his ability to put simple ideas into words. Of this same test it is stated in the Yerkes-Bridges Point Scale that it calls for ideation, association and analysis.

This is the only use of the term apperception found in Terman's book; in the analysis of no other test do we find him using the word, but there is considerable discussion about the 'completion test' idea, of which we shall speak later when considering the Ebbinghaus test.

In the book on the Yerkes-Bridges Point Scale, a modification of the Binet-Simon tests, we find interpretation of pictures singled out as involving, among other mental processes, apperception. No doubt in 'explaining the picture' the child does interpret, picking out what to him is significant and interpreting this in the light of relationships. At least, this occurs at the higher ages, when meaning rather than enumeration or description is stressed. But the answers required are meager and the test first appears at the fifteen-year level, so that very little gauge of apperception is offered.

Several tests included in age scales may properly be discussed briefly here though they are not incorporated in the scale to measure apperception, according to the authors. The analogies found in the Yerkes-Bridges Scale require comprehending relationships between two nouns and stating the same relationship between two other nouns. Here apperception is needed, as it is in the so-called mixed relationship test, but there is much less of the element of determining the essentials, less of what we have called sizing up the situation. There are no seemingly obvious other possibilities, the main one to be decided upon, for the single relationship to be realized is already picked out. According to the authors of the scale this test requires logical judgment based on analysis, reasoning, attention and memory.

XUM

The absurdities test, found in all age scales, is another instance where the relationship between ideas is essential in the solution. Terman calls this a test of critical powers and of judgment. The authors of the Yerkes-Bridges Scale call it a test for logical judgment based on imagination, analysis and reasoning. The critical power or logical judgment involved depends upon seeing that the relationships expressed in the anecdotes are irreconcilable, that is, the relationship itself is not to be formulated by the individual being tested, but he must appreciate it in order that the statement be recognized as impossible. In other words, apperception is involved in so far as one cannot be critical about a situation unless he grasps the import of the situation.

We should regard the Ebbinghaus Completion test as one requiring apperception; Whipple placed this well-known test among tests of imagination and invention, calling it a 'combinatory' test; he lists it with the ink blot and some other tests. He states that if the Ebbinghaus test is easy, it becomes virtually a test of controlled association; if difficult, a test of creative imagination. Terman thinks this test involves command of language and to some extent memory and association; Pyle, that it is to some extent a test of reasoning capacity.

Trabue, who has modified the original paragraph form of the Ebbinghaus test into separate sentences increasing in difficulty to form a scale, makes only the general statement that the scale measures ability along certain lines closely related to language. Surveying these opinions we see that there is no considerable agreement between the views regarding the Ebbinghaus test and its modifications. Language, of course, is involved. One must both understand the portions of the sentences given and have at his command a vocabulary adequate to supply the missing words. Where the idea expressed is very simple, the missing word can be supplied by easily controlled association, *e.g.*, "Good boys ——— kind ——— their sisters." But as the sentences grow more and more difficult it becomes necessary to grasp the meaning of the parts which are separated by the elisions

and to find a true relationship between them. We cannot agree with Whipple that imagination and invention are largely involved, and that independent, even seemingly contradictory impressions are to be combined. The relationship between the ideas may be stated by inserting words similar in meaning, but the idea itself does not permit invention, it is clearly determined; the parts are not independent, there is supposed to be and is a relationship which obtains no matter with what words the elisions are filled. Thus, in the Trabue tests, language is the tool and the prerequisite for success in all the sentences, but in the more difficult, at least, apperception would seem to be required. A large element in the practical value of the test is dependent on the language ability which unquestionably complicates the result as far as gauging apperceptive ability is concerned.

Most similar to language completion tests in some ways are the Healy pictorial completion tests. Here there are omissions, but of parts of a picture instead of words. In both, the subject who is being tested has a certain situation presented, one pictorially, the other in words. In both the subject has a stock of ideas from which to draw, the one pictures, the other vocabulary. Reasoning, as such, in both is very simple and neither involves much foresight. The simple situations in the Healy pictorial test differ from the simple sentences of the Trabue, which may be solved so largely by association. The Trabue sentences also give aids which minimize the necessity for recognition of relations as in phrases where idiomatic forms are so well associated in the memory. So we see that in filling out the Trabue sentences appreciation of relationship of ideas is not always needed.

In the Healy pictorial test situations are presented in a form that does not depend upon knowledge of language. The situations pictured are all well within ordinary experience; hence the perceptions should be correct. What is mainly required is sizing up of the situations, interpreting them, seeing the relationship between the activity depicted and the missing piece. The reasoning is almost *nil*, once the

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essential element is seen. The significance is due to relationships, the meaning of one element in the light of others. Little creative imagination is needed, since the stock of ideas is furnished in the pieces. In the improved new test these points are made vastly clearer, the situations are more complicated and require better appreciation of the elements in each than is found in the old pictorial test.

One other type of test is interesting to compare with those for apperception—namely those where the problem is one of generalization, as in the 'multiple choice test' in various forms. Here the relationship is realized through the process of dissociation. The relationship is the one unchanging feature in a succession of experiences, all the other concomitants of which vary. The realization of the law of relationship is reached through repetition of experience. Thus generalization is here arrived at through dissociation rather than through apperception.

It is obviously not possible to attempt an analysis of all tests now in use which require apperceptive powers to some extent. In many apperception is involved, but complicated by other processes and hence difficult to disentangle. Usually it is not involved sufficiently to allow one to make any interpretation of the subject's apperceptive abilities.

There still remains a very interesting and practically important point; namely the relationship between apperceptive abilities and so-called 'general intelligence.' To what extent is an intelligence quotient diagnostic of this perhaps more specialized capacity?

A survey of the results attained on various tests by a group of 1,043 cases studied at the Judge Baker Foundation, 729 of whom are repeated offenders, shows a low correlation between Pictorial Completion Test II. score and the Stanford-Binet intelligence quotient. For twelve-year-olds the coefficient of correlation is 33, for sixteen-year-olds it is 10. For this group, then, the Terman I. Q. does not afford a measure of apperceptive ability. Furthermore, comparison of the results obtained by the selected groups with those obtained by an unselected group, tested in order to obtain

age-norms, shows that delinquents as a group do not differ from an unselected group of non-delinquents sufficiently to be significant. But individual case-studies show that in instances defective apperceptions are directly related to delinquency, indeed are perhaps the main cause.

Conclusion

We have attempted to show that there is justification for considering apperception as a mental process, important to be taken into account in estimating abilities, involved frequently in other mental activities, yet distinct from them. If this is true, we need to consider which tests enable us best to study this ability. The Pictorial Completion test would seem to measure little else than apperception and hence to be a splendid means of estimating it, while the Trabue Language Scales give a measure of it but so influenced by language ability that the latter must always be taken into consideration. In cases studied at the Judge Baker Foundation, apperceptive ability as measured by Healy Pictorial Completion Test II. correlates but slightly with the intelligence quotient obtained on the Stanford-Binet Scale. This makes it all the more urgent to study by means of specialized tests the apperceptive ability of individuals since, among both the mentally normal and the defective, it represents a particularized ability that has prognostic value and important social implications.

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THE MOTIVATION OF RADICALISM

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The terms reactionism, conservatism, progressivism, and radicalism are all relative, both to one another and to any given social situation or problem. It is not possible, therefore, exactly to define radicalism. In general, however, we may take radicalism as a term—originally of opprobrium, which use some interests would like to reëstablish—connotative of desire and advocacy of thorough-going innovative change of the social environment, or of some particular part of that environment which impinges upon and conditions the life of the individual in an annoying way.

Generally speaking, radicalism—the desire for and advocacy of thorough-going social innovation—is the product of unrest. Unrest is the expression of personal discomfort. Thoroughly comfortable individuals never become radicals. The main reason why people desire innovative change in social organization or process is that they are uncomfortable under the existing *status quo* and see no prospect of relief by altering their own personal situation or in reactionary modification of the environment.

Not all discomfort, even when extreme, leads to radicalism. The uncomfortable individual, annoyed by a felt maladjustment between himself and his social surroundings, may be able to relieve his discomfort and annoyance simply by shifting his own position to a different, but existing, environment. Annoyed by poverty he may by hook or crook climb out of it. Discontented with his job or vocation he may take up another. Dissatisfied with Old World opportunities he may come to the New. Restless under religious controls he may cast them off, or, on the other hand, unable to find peace and courage in rational realism, he may take refuge in religious mysticism. In other words, dsicomfort may—and in the

more static social epochs, with most individuals, ordinarily does—lead either to more or less sustained and persistent attempts to shift one's self to an existing environment in which comfort can be found, or to patient, painstaking effort, in many cases successful, to discipline the self and adjust the personality to the social situation in which one happens to have been placed. Discomfort may thus lead only to individual effort purely for direct personal ends, to a contented disbelief in the efficacy of human effort, to sullen stoicism, to cynicism, or possibly to blind rage finding relief in mob violence.

Discomfort may not lead even to a mild progressivism, in any social sense. It may produce no attempt to change the environment itself even in superficial ways. In such cases we must conclude that the individual's life is so dominated by fixed habits that failure of certain aspects of his personality to obtain adjustment and healthful functioning is not sufficient stimulus to break down the inertia of his established routines and attitudes. Similarly, his social or economic position may be such that no ordinary amount of discomfort or maladjustment serves to overcome his fear. This is notably the case in certain types of what may be termed the 'conservatism of necessitous condition.' When the uncomfortable person contemplates no other method of removing his discomfort than those at the time recognized and practiced as conventionally right and proper—for example, the 'business principles' of self-help, *caveat emptor*, charging what the traffic will bear, individual energy, initiative and thrift, and the 'go get it' spirit, or the Christian virtues of modesty, humility, self-criticism, conscientious soul-searchings, and conviction of sin and unworthiness—the radical attitude does not develop, because these methods contemplate no objective environmental change.

Only when discomfort or dissatisfaction creates a desire for significant changes or transformations in social organization, relations, or standards does it lead to other than essentially habitual conservative attitudes. When the desire for thorough-going, fundamental, and rapid change of the environ-

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ment in essential respects is present, the sources of this desire will always be found to be some maladjustment between the individual and his surroundings, such that he is consciously uncomfortable and restless, and such that he seeks relief not in modification of his own personality but in transformation of the external social world. It is not essential that he know the causes of his discomfort or that the objective changes he desires be such as would remove the real causes.

Desire is always a disposition to change—to do something that one is not doing, to have something that one has not, or be rid of something that one has, or to be something other than one is, or thinks one is, at the particular moment. Desire is the result of stimulus, and stimulus always leads to some sort of bodily or psycho-physical activity. The stimulus, whether from some part of the organism itself or from the external environment (physical or social), produces a disequilibrium, which is normally balanced by the appropriate reaction or response. The normal, healthy conservative lives a life of short-cycle routine (largely habitual) in which organic disequilibria, physical or mental, are balanced, and the energy of desire or unrest released in a fairly regular rhythm. In individuals who become radicals, this short-cycle ebb and flow of disequilibrium and equilibrium, of desire and satisfaction, of stimulus and releasing reaction, is broken into by desires or interests which do not find release or expression in normal rhythmic response. A state of more or less chronic unrest ensues, and may become the basis for definitely formulated desire for fundamental change in the environment.

Any impulse to action, any 'motor set,' desire, or disposition, the carrying out of which is impeded, prevented, or balked, gives rise to organic unrest, which may be merely physical, or 'spiritual.'[1] Now what happens when a desire

[1] All unrest has its physical basis. Even 'spiritual' disequilibrium may—when physiological psychology attains more adequate analytical power than it now has—be explained in physical terms, if any gain in clearness of understanding is to be had thereby. The terms physical and spiritual are here used in a somewhat popular or conventional sense. A man may be restless because, unconsciously to himself, his thyroid glands are overactive, because he is conscious of hunger, or because he wishes to solve

or an interest is balked?[1] Normally an unbalked desire is fulfilled and terminated by the appropriate motor activity, and an unimpeded interest functions in a recurring ebb-and-flow of attention and activity.[2] Fulfillment of desire or interest is accompanied by the appropriate feelings or emotions, mostly of a 'pleasurable' or satisfying character. When the interest is impeded or balked, however,—that is, when the normal motor response which would release the energy of the desire cannot take place—the emotional accompaniment is different. The energy held back is likely to go into a ferment, at least until it can find some other outlet than the one to which the desire or interest was at first directed. The central emotion of the balked disposition is 'hurt-feeling,' resentment, or anger. Accompanying emotions may also be fear, discouragement, or simply a generalized and diffused sense of uneasiness. Which emotions or emotional complexes are most in evidence will depend on the type of temperament and character.

a mathematical problem, rescue a fellow-man from suffering, or is himself suffering under a 'conviction of sin.'

[1] Throughout this article, except where the context clearly implies otherwise, the term *interest* is used with the connotation current among sociologists, rather than in the more technical psychological sense. Interests, in the sociological sense, according to Ross, are 'complexes woven of multicolored strands of desire' ('Foundations of Sociology,' 1905, p. 168) or 'certain great complexes which contribute to satisfy a number of our innate cravings' and which appeal 'to so many sides of human nature that for most men' they become objects 'of abiding concern and desire' ('Principles of Sociology,' 1920, p. 51). For variant conceptions, but with the same general connotation, see Small, 'General Sociology,' 1905, p. 433, Ward, 'Pure Sociology,' 1903, p. 108, and Ellwood, 'Sociology in Its Psychological Aspects,' 1912, p. 118. Ellwood, however, suggests that in order to avoid ambiguity it would perhaps be better to use the term only in the psychological sense. Dewey ('Interest and Effort in Education,' 1913, p. 17) says that "the root idea of the term (interest in the psychological sense) seems to be that of being engaged, engrossed or entirely taken up with some activity because of its recognized worth." An interest in the sociological sense, then, may be regarded as that in which one desires to be engaged or engrossed, at least for the time being. Objectively it is a complex of stimuli which claim the attention and the psychological interest, stimulate desires of a certain order, and afford gratification of those desires in a serial, ebb-and-flow manner. Subjectively it would seem to be the complex of desires and emotions associated with attention to these stimuli. Taking the term in this subjective sense, interest is as open to obstruction as is simple desire.

[2] This statement will hold whether the desire is a simple physical 'appetite,' an urge to intellectual activity, or an impulse to 'get in tune with the infinite.' On thinking, for instance, as motor activity, see Watson, 'Psychology from the Standpoint of a Behaviorist,' 1919, p. 15 and Ch. 9.

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It should be understood that the initial anger is not due to loss of the object of the desire or failure to achieve the aims of the interest, but follows immediately in a purely reflexive manner upon the balking of the wish, or the damming up of the motor activity appropriate to the realization of the wish. The organism is 'set' for a given line of action, and when action cannot be carried out along that line the universal first impulse is toward those motor reflexes which are the manifestations of anger, in some one of its many forms, and which are classified under the general term pugnacity. One of these initial reflexes, and perhaps fundamentally the most important one in its social consequences, is the tendency to blame somebody—some *person*—as an object upon whom the angered organism, now set for combat, may make its attack.

Reflexive anger, blame, and set-for-combat are the initial, reflexive effort of the organism to prepare itself for action in a new situation involving a break in the regular routine of habit or obstruction of the carrying out of desire and interest. But anger and fear are closely associated, are perhaps but the two sides of one shield. Whether the combative impulse associated with anger, or the avoidance impulse attendant on fear shall guide and motivate subsequent activity can be foretold only if we know both the general situation and the character and temperament of the individual.

In any case the individual is confronted with the necessity of making some sort of readjustment between himself and his environment. He may attempt to accomplish this by attack upon the environment, or may elect, under the influence of fear (timidity, lack of self-confidence, etc.) to modify his desires and docilely accept whatever the situation may hold in store for the meek and non-resistant personality. If attack rather than self-repression is the chosen mode of readjustment the resulting attitude may very well be radical, although it might be reactionary. In the more intellectualistic temperaments the combative impulse may give way to curiosity and contrivance impulses, and the attack carried out not so much in militant as in workmanlike manner.

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Speaking in the by and large, readjustment will take place through one of three processes—(1) repression, (2) substitution and transference, and (3) reinforcement. In the first, the obstructed desire or interest is repressed or totally suppressed. In the second, it is 'sublimated' through the substitution of other desires or interests and transfer of attention to them. In the third, attention is concentrated upon the obstructed desire and it is reinforced by the desire or determination to remove the obstructing agency. The method of readjustment obviously has important causal bearing on the psychology, and especially the motivation, of conservative and radical attitudes.

1. *Repression or Total Suppression.*—Where the readjustment is accomplished by a recession of the obstructed desire, the desire (*a*) either drops automatically out of the individual's life (that is, is completely forgotten) and retains no influence even in the unconscious, or (*b*) is suppressed—driven out of the individual's life by conscious act of will (desire to be rid of it [1]), or (*c*) apparently totally suppressed, it may in reality only be held in durance vile in the subconscious or unconscious by the 'censor,' which may be for the occasion either conscience, fear, or rational control. In case the desire is relatively superficial and unimportant, it is simply dropped and forgotten without struggle or effort, and without appreciable disturbance to the personality. Where it is of greater amplitude and intensity, involves a significant disequilibrium of energy, and is regarded as important, the individual can dismiss it from his life only by conscious specific attention and act of will, accomplishing complete suppression. In this case the individual gives the desire concentrated attention for the time being, not with the idea of its realization in spite of all impediments, but with the conscious purpose of getting rid of it once for all. It is highly important to him, but, from whatever reason, he prefers not to push for its fulfillment. His will to forgetting or suppression is really the stronger desire to avoid

[1] The stickler for strict psychoanalytical procedure may object that this is only a type of sublimation.

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the disagreeable results probably involved in effort to overcome the obstacles to the realization of the original desire.

With the balked disposition totally suppressed, the individual can proceed to other interests, untroubled and unhampered by the disturbing emotions experienced at the time of the balking. The *idea* or the purpose of the desire is dismissed, and with it the desire. The energy which would have gone to its realization, had the individual been left free to carry out his purpose, is now free to be applied, without ulterior motive, and without regrets or hesitancy, to other interests which can be pursued without impediment from the existing social *status quo*. Where complete suppression takes place in this manner, and the individual turns his attention and energies to conventional interests, it is obvious that the reflexive anger and resentment attendant upon balked desire do not afford any effective impulse toward progressive or radical attitudes. In suppression of desire and acquiesence in the continued existence of the obstruction we have further light on the psychology of the easy-going flabby conservative. If, in such an individual, an incipient radical impulse does arise, it is immediately suppressed, and by reason of repetition of this suppression process the acquiescent do-nothing habit is firmly established.

The term suppression, or total suppression, is meant to signify that the desire is gone out of the personality completely—that it does not hang around in the subconscious or unconscious seeking egress into consciousness again at some favorable opportunity. Some psychologists hold that there is no such thing as total suppression of a wish while others hold that there is.[1] The psychoanalytical view is that once a desire is experienced, even though it never reach formulation in words (ideas), it is never so entirely destroyed, suppressed, or repressed that it may not return, though perhaps in disguised and symbolical form, to plague the individual. According to this view the desire is either held down in the unconscious by the main force and watchful police functioning

[1] The latter view is supported by Dunlap's somewhat caustic criticism of the psychoanalytic position, in his 'Mysticism, Freudianism, and Scientific Psychology,' 1920. See especially, pp. 46–50, 95, 105–108.

of the conscientious 'censor,' or through sublimation (the second of our above mentioned methods of readjustment) is allowed to drain off its energies in collateral, and perhaps diluted, streams of interest. If by the 'unconscious' is meant instinctive impulses which are not usually defined in idea form and which are habitually inhibited or unconsciously sublimated, or, from the behavioristic standpoint, obscure physiological processes (reflex arcs and arc-complexes) of which the individual is entirely unaware, it is reasonable enough to suppose that no desire ever occurs without leaving some trace of habituation or characterization upon the personality, some latent tendency for the obstructed reflex-complex to be carried out should opportunity and stimulus to it ever recur.

From a scientific, deterministic standpoint, indeed, some such trace of characterization must always remain. The individual is the product of all his past reactions, both releases and repressions. This is succinctly put by Watson when he concludes, in italics, that "youthful, outgrown, and partially discarded habit and instinctive systems of reaction can and possibly always do influence the functioning of our adult systems of reaction and influence to a certain extent even the possibility of our forming the new habit systems which we must reasonably be expected to form," [1] and again where, by implication accepting the psychoanalytic view, he says:

"Unquestionably the completeness with which old habits and the emotional factor connected with them which do not work are put away when the new situation is faced, tremendously modifies the type of personality each individual develops into . . . Possibly no one of us escapes unscathed through the childhood and adolescence stages. The early situations when again faced by the adult may not call out the overt infant reactions but they do not wholly lose their power to stir up the old implicit emotional activity. . . . A great many individuals have water-tight compartments

[1] 'Psychology from the Standpoint of a Behaviorist,' 1919, p. 418.

filled with old reaction systems which resist the storm and stress of adult life."[1]

While the reference here is to childhood desires and tendencies, the thought applies equally well to any desire or interest the balking of which necessitates readjustment of reaction systems.

It should be remembered, however, that the psychoanalysts' conclusions have thus far been derived almost entirely from observation of mentally pathological individuals, in which old and obstructed desires or 'complexes' have not been discarded or even effectively repressed. Had they given more attention to normal individuals it is quite possible that they would accept the idea of total suppression. In the case of normal personality, it makes little difference whether we call the process of getting rid of a desire which one does not care or dare to push against social obstruction, total suppression, or repression into the unconscious. The fact remains that so far as the individual's conscious life is concerned he does get rid of the desire and of the emotions experienced at the time of its obstruction, and that he has accomplished the riddance by a conscious exercise of will, by 'direct action,' without the conscious aid of sublimation devices. The bearing of these facts on the formation of social attitudes is that suppression, or repression, is not at all likely to produce radical attitudes.

2. *Transference and Substitution.*—The second method of readjustment is by way of what the psychoanalysts have named sublimation—the substitution of other desires or interests and the transference to them of the attention and energy which would have gone to the realization of the old desire. The term sublimation is an unfortunate one, however, since it connotes a lifting up and implies that the interests to which attention is transferred are 'higher' and more worthy than the original desire. This connotation would seem to be carried especially by transfer of attention from sex to non-sexual interests. The psychopathologists have found repressed sex or 'holophilic'[2] desires to be the most

[1] *Ibid.*, p. 416.

[2] See Frink, 'Morbid Fears and Compulsions,' 1918, pp. 4, 5.

prevalent causes of neurotic disturbances and have proceeded to cures through methods which involve essentially a release of the repressed desires from the unconscious to consciousness and their dilution or depotentiation through sublimation. Since the unconscious holophilic desires of the neurotic temperament are so often infantile complexes of an incestuous nature—instinctive hold-overs which constitute gross abnormalities in adult life—it was natural that the term sublimation, with its connotation of lifting up to a more worthy plane, should have been adopted to denote the process of transference of attention to substituted interests. But as a term applicable in the psychology of normal persons it is open to obvious and serious objection. Many men disappointed in love have taken to drink. The transfer may be from a higher, worthy desire to a lower, unworthy one. We prefer therefore to use the terms transference and substitution for the general process the psychoanalysts call sublimation. Sublimation, strictly defined, should be regarded as only a type of transference.[1]

Substitution and transference may be consciously and purposefully undertaken and directed, or may be largely an unconscious process. New interests may be created, or old interests given greater attention, with the direct and conscious purpose of 'taking the mind off' the disappointment and unrest occasioned by obstructed desire. The existence of this original desire is frankly recognized, but there is no attempt to suppress or repress it. It is simply deprived of support and is atrophied by disuse, since attention is withdrawn from it, and interest in it diminished, in proportion to the degree that they are transferred to the interest in process of substitution. The energy which would have gone into the realization of the original desire, had it not been

[1] This term, transference, is used by the psychoanalysts in a highly technical sense, practically synonymous with the 'conditioned reflex' of the behaviorists. (See Frink, *op. cit.*, pp. 192–197.) That is not good reason, however, why it should not be used for the purpose suggested in the text. There is no other term which suggests so accurately and definitely just what takes place in this second method of readjustment. Frink's term 'displacement' and Dunlap's 'drainage' mean the same thing, but do not seem to be as suggestively descriptive as 'transference.'

balked, or which might have been used in attempts (perhaps successful) at suppression or total repression, or gone into the conflicts of a disorganized personality in the event that repression proved a failure, is now switched to other tracks which gradually develop capacity to handle the whole traffic. When this stage is reached and the old desire reduced to innocuous desuetude, the process of substitution and transference is complete. The abnormal disequilibrium produced by the balking of the original desire is corrected; the personality is compensated by the new interest. The individual's energies now continue to function with unabated vigor, though in new directions and to altered objectives.

This whole process may be carried out unconsciously, and perhaps is so in the vast majority of cases. Attempts at repression may be made and fail, or prove only partially successful. The repressed desire escapes the watchfulness of the 'censor,' but in disguised or symbolic form, in which form it may, in weak temperaments, play pranks enough to bring on a neurosis, or may unconsciously be directed to new objectives which in conscious activity symbolize it and give release to it. The final results of such unconscious transference and substitution may not be essentially different from those of conscious transference; except that where the process is consciously directed, intelligence has a chance to prevent or minimize the tendency to dispersion of interests and to the dilettantism likely to attend unconscious transference.

We are now in position to note the influence of transference and substitution upon social attitudes. Whether the new interests to which the attention and the energy of the old desire are directed are of a conservative or radical nature will depend primarily upon the temperament and previous habituation of the individual. If he is of a non-resistant type, strongly motivated by fear complexes, or if he is deeply habituated to the existing general order of things—in brief, if he is a temperamental or characteristic conservative—his transference will be to substituted interests not in conflict with the existing conventional order

or the main trend of sentiment in his class and locality. If in such a temperament transference does take place to radical interests it is probably a case of compensation, in the technical psychoanalytical sense. The non-resistent worm does sometimes turn, and when he turns it is likely to be with tiger-like ferocity.

If on the other hand the individual be of a more assertive and pugnacious temperament, transference is much more likely to be to radical interests. In either case the new interests, especially where the transference is unconscious, are in a measure symbolical of the balked desire, and we may accordingly, for convenience, speak of symbolical conservatism and symbolical radicalism.

This kind of conservatism is very common. A vast amount of interest in, and devotion to, conventional social and religious activities has this background and motivation. No small amount of 'social service,' in charity work, social settlements, mission work, both home and foreign, 'crusades,' and 'uplift' movements is indulged in by individuals who are unconsciously compensating for balked dispositions. This is particularly true of volunteer work, and is probably truer of women than of men. Women are by no means alone, however, in this symbolical conservatism. Checkmated in the struggle for 'success' on the commercial battleground, our male friend joins the army of back-to-the-land sentimentalists. Failing in his ambition for distinction in his field, the mediocre professional man settles down to routine work and creature comforts, and finds soothing release in an arm chair, popular magazines, an automobile and golf, and vicarious interest in the ambitions and activities of his children.[1]

It is now well recognized that much of the restlessness of modern women comes from the fact that the domestic duties of the home, under the modern small family system, and since the factory and other non-domestic agencies have taken over so much of the work which formerly had to be done in the individual household, are not sufficiently engrossing to

[1] It is commonly said that children help to keep parents young (via this vicarious interest), but there is perhaps quite as strong an influence toward hastening the oncoming of attributes of age.

occupy the attention or to give outlet for the instinct of workmanship and self-expression. This is especially the case with the woman whose children are 'married and gone.' She needs new interests to which to transfer her activities, now balked for lack of objective. Bridge and the movies are but imperfect substitutes, as any psychopathic clinic, or observation of the average highly domesticated middle class 'post-graduate mother,' will bear evidence. Consequently certain aspects of the woman movement are not so wildly radical as some short-sighted opponents suppose. It can scarcely be considered irrational radicalism to ask for such change in social conventions as will allow the postgraduate mother to transfer her now balked attention and energy to substitute interests of more social utility than the organized futility of social functions and 'literary' clubs without feeling that she is violating the accepted canons of taste and respectability.[1]

In temperaments strongly actuated by fear-complexes, desire-obstruction and transference of attention may lead to a different type of symbolical conservatism. The anger and resentment which in one form or another always accompany the balking of a wish and which usually produce the impulse to blame somebody are turned inward upon the self. The painful emotions of the obstructed desire are reinforced by self-castigation, the conviction of having made an ass of one's self, or a sense of sin. Under the impression that the desire was improper or sinful, the individual may resort to philosophical or mystical doctrines of resignation and renunciation; and in order to realize these ideals in his living he reinforces the consciousness of wrong-doing or of sin and then proceeds to the task of self-reform through repression and sublimation. The resentment which in some cases might have been directed against other persons, against the social organization or 'fate,' is turned upon the self, and the energies of the balked interest transferred to the task of reshaping the personality. Personal 'salvation' becomes a leading interest, symbolical of the obstructed desires.

[1] Cf. Anna Garland Spencer, 'Woman's Share in Social Culture,' 1913, Chapter 8.

It needs no erudite analysis to suggest that here has been the opportunity of the church, managed by conservative interests, to utilize the processes of sublimation and transference to keep restless individuals, suffering from the social and economic obstruction of legitimate desires and ambitions, from turning their baffled energies to the reform of social relations. As long as religion could be kept a matter of sense of sin and personal salvation, producing, through various types of mystical sublimation, acquiescent attitudes of resignation and contentment, it remained a powerful agent for conservative control. It is of very great significance when the church, as in America at the present time, begins to turn its attention, in part at least, to the removal of social and economic obstructions to the development of strong and symmetrical personalities. It indicates that the old process of repression and introspective transference are recognized to be inadequate to the development of the type of character demanded by the conditions of modern life. Where the church until recently encouraged the dissipation of personal energy in repression or mystical idealism and self-reform, to the practical ignoring of social and economic causation of 'sin' and misery, the more intelligent and progressive part of it now seeks to direct the transfer of balked-interest energy to channels and objectives which may prove quite the reverse of conservative.

Symbolical radicalism results from unrest and disequilibrium when the attention is transferred from impeded interests to radical movements or 'causes.' It is not essential that the movements to which the energy is transferred should be such as would, if carried through to success, remove the specific obstructions to the balked desire. The repressed energy may be placed to the service of the first radical movement which claims attention. All radical social movements aim at thorough-going change of social organization or relations in some one or more particular, and the motive to the desired change is the removal of obstruction of some kind. Hence any radical movement may take on, for the individual in question, a symbolical character. Since one cannot satisfy

the original desire, although it is felt to be entirely normal and legitimate, since one realizes also that the seat of the obstruction is somewhere in the existing social *status quo*, and also perhaps believes that the specific obstacle cannot be removed, attention and energy are turned to some other type of obstruction or to generalized revolt against all and any of the elements of control in the present social system. In extreme cases this leads to the anarchistic attitude, and it summarizes some of the psychic processes of the 'working stiff' and I.W.W-ism, to whose abnormal but natural and perhaps justifiable complexes Carlton Parker and others have so strikingly and appealingly called our attention.

Symbolical radicalism, due to more or less unconscious transference of the energy of balked or repressed interests, may be found in the intellectual type of mind, but is more prevalent in emotional types. Such radicalism is likely to be superficial, emotional, lacking in settled principle, and unstable in its aim or object of attack. There may be a sort of serial transference. When one line of attack or radical project encounters difficulties and does not move rapidly toward consummation, it is given up (a wish easily balked) and the attention turned to some other project which for a time elicits equally emotional enthusiasm and serves as another temporary outlet for the energy of the balked or repressed desire. There may thus develop radical fashions and fads and a kind of lo here! lo there! radicalism, which never 'stays put' long enough on one thing to accomplish any thorough-going objective change in social organization.

3. *Reinforcement.*—The third method of readjustment consists in conscious reinforcement of obstructed desire. Instead of suppressing the balked disposition, attempting to repress it, or 'sublimating' it by transference and substitution, we make the desire a conscious, dynamic, motivating force to its own realization in spite of obstacles. This involves bringing to its support the determination to remove the obstructions and 'see the thing through,' perhaps against all odds. We put on our fighting clothes, and instead of wasting energy in repression, self-pity, split personality, or

symbolical and diffused sublimation, we proceed in militant or workmanlike manner to clear the ground for the realization of the obstructed interest. This is the central line of radical motivation and action, so far as the radical attitude is the result of balked dispositions. Where obstruction and reinforcement reaction lead to absorption in the radical movement or program designed to remove the specific obstructions, the final result may amount to a practically complete transference, for the time being, of the interest of the original desire to interest in winning the victory over the agencies which have occasioned the obstruction.

The results of such transference are different and more pointed than those likely to flow from the transferences hitherto noted. People who know what they want in the way of radical change, and why they want it, and who go about vigorously to accomplish the change, are far more likely to accomplish definite results (whether for good or ill) than those whose radicalism is of the symbolical and dilettante variety. In general, one of the main springs of progress is the aggressive reinforcement of impeded interest—the active, dynamic, and directed discontent which drives people to attack the obstructions to wish fulfillment.

Starting from personal unrest and balked desires, the analysis has led us through emotions of hurt-feeling, resentment, and anger to blame-reactions and combat attitudes, with just the suggestion that in disciplined intellectual temperaments the blame and combat attitudes give way at least in part to curiosity and workmanship impulses. The three processes by which an individual suffering from obstructed interests attains readjustment to his environment, or at least obtains a *modus vivendi* have been described as repression, substitution and transference, and reinforcement. Substitution and transference, more commonly called sublimation, are likely, as we have attempted to show, to lead to a somewhat ineffective 'symbolical radicalism.' Only the third process, reinforcement, can be depended upon to give drive and consistency to radical movements, or to make of radicalism a powerful social force.

The analysis of balked-interest motivation to radicalism could be brought to a close at this point, provided all individuals taking a radical trend sublimated or reinforced their desires in substantially similar manner. This is by no means the case, however. Without assuming that there are definable mental types, such as Giddings[1] has attempted, we think with some reason, to distinguish, it is safe to say that some persons are more emotional than others, some act with deliberation and some without it, and some have disciplined intellectual interests and controls, while others have not. Temperamental and cultural differences of these kinds will inevitably influence the *method* of sublimation or reinforcement. And the method may spell success or failure to attain the purposed end—escape from, or removal of, the obstruction to wish-fulfillment.

It would draw this article out to unreasonable length to enter upon this phase of the subject. Let it suffice to suggest (1) that the masses of men and women never attain to any consistent progressivism or radicalism because they either repress or sublimate their obstructed or errant desires, thus securing conservative adaptation to the existing environment, or remove themselves to a different environment, or reinforce their desires in an inconstant, explosive, blame-and-combat fashion; (2) that in a certain number of disciplined, yet highly emotional, temperaments, the typical reaction is reinforcement with great and constant intensity and with strong proclivity to praise and blame attitudes; (3) that these temperaments furnish most of the active leaders of radical movements; and finally, (4) that the more impersonal, scientifically analytical, but not necessarily unsympathetic intellectual individual does not often share in active leadership of radical movements or propaganda, but may nevertheless by the logic of facts and by his own objective honesty be compelled to furnish no inconsiderable aid to active radicalism. By his scientific analysis of both the personal (behavioristic) and the impersonal (institutional, genetic,

[1] F. H. Giddings, 'A Provisional Distribution of the Population of the United States into Psychological Classes.' PSYCHOL. REV., 1901, 8, 337–349. Also 'Readings in Descriptive and Historical Sociology,' 1906, pp. 236–239.

and mechanistic) causes of obstruction, he may chart the ground for the active radical leaders and help clear the way for the constructive efforts of the social engineer, whose province is not to fight the battles of conflicting economic or social interests, but to apply technological knowledge to the structure and organization of a better functioning social mechanism.

In all the preceding discussion the motivation of radicalism is found in the incompleteness of habituation and of acquiescence to the existing *status quo* and in the unrest and desire-obstruction which result from conflict of social interests and standards—the conflict between the tried and familiar and the novel and ideal.

We have now to raise the question whether all radical motivation is properly to be explained in terms of desire-obstruction and reinforcement, or whether there are instincts and proclivities which would produce the radical attitude even in the absence of obstruction and restrictive external controls.

That there are positive instincts which give rise to desire for innovation can not well be questioned. These include the instinct of curiosity (the tap-root of all science), the instinct of workmanship and contrivance (the root of the practical arts), and instincts of aesthetic self-expression (the root of the fine arts). There are also, in any differentiated social organization, proclivities such as imitation and emulation, sympathy and antipathy, desire for distinction, and the like, which certainly constitute impulses to innovation.

But whether these positive instinctive urges and socially aroused interests would in themselves produce the radical attitude depends somewhat on the meaning which we are to give the term radicalism. If 'radical' is a term to be applied to all desire for thorough-going innovation, it will apply to those who have such desire whether they encounter any social opposition or not. The great inventors and artists—all innovators—would then be classed as radicals. But if radicalism connotes innovative desire *opposed*, not by the difficulties involved in control of physical nature, but by

social obstacles—by the conservative habituation and standpatism of other individuals or classes—socially unrestricted instincts of workmanship, contrivance, etc., would not be regarded as motives to radicalism.

This view of the matter would amount to drawing a distinction between innovative and radical desires. Innovative desire would then be called radical only when opposed. Such a distinction, while logically proper, is in fact somewhat academic because in actual life there is scarcely any innovative desire, especially desire for thorough-going and fundamental innovation, which does not all along encounter more or less social opposition in the form of conservative and reactionary obstruction. In a society without serious conflicts of narrow selfish interests, and with freedom for the functioning of the instincts of curiosity, contrivance, and aesthetic self-expression, the inventor, the artist, and the engineer would be producing enormous changes in our mode of living. The motivation to their work would be the creative impulses; and we could leave socially balked desires and obstructed interests out of the discussion. But we have no such society and are not likely soon to have it. The very existence of self-expression instincts, seeking outlet in innovation, arouses opposition and institutes that objective balking of disposition and that unrest which we have described as the main source and cause of the radical attitude.

Conservatism (or reaction) and radicalism are the opposite ends of the attitudinal spectrum. Innovation always has to contend against habituation, social sympathy and cooperation against intrenched special interest, rational construction against sentimental, dogmatic conventionalism, and courageous curiosity against fear. To all practical intent there is hardly a human interest or impulse which, if it involve any very serious innovative desire, will not encounter social opposition and become to that extent an obstructed interest.

From whatever reason, some individuals are temperamentally more inclined to innovative desires than are others. There are degrees of domination by fear and freedom from

it, of originality and independence as contrasted with imitativeness and easy acceptance of authority, of habituation and refusal to become habituated. These differences of temperament appear in connection with all the great interests of life—curiosity and intellectual interests in general; workmanship, contrivance, and aesthetic expression; religious, ethical, and political interests; and acquisitive interests involving subjective standards of living, ambition, economic emulation, competition, and cooperation. Equally important temperamental differences exist with regard to motivation by egotism and sympathy, by hope, faith, loyalty, suspicion, distrust, desire for distinction, and desire for obscurity.

It is important to note that the obstructed desire of the radical may be one which has arisen from sympathy and not from any form of narrow selfishness. The mass of radicals are radical possibly primarily because of some acquisitive spirit or personal ambition—desire to raise their own standard of living; but there can be little doubt that misery loves company and that the solidarity of laboring class radicalism flows from a collective sympathy within the working classes. That there is not more dependable solidarity may be due both to deficiency in sympathy and to the hard struggle for existence, or for the retentions of living standards already won, which the workers are constantly compelled to make. The sincere radical leaders are beyond doubt men and women of broad sympathies and capacity for self-sacrifice. The life of the radical leader is not usually the type of life that an inherently selfish individual would choose.[1] On the other hand, while the current conservative allusion to self-seeking "agitators" and labor leaders sponging off the rank and file is to be taken for what it is—propaganda—it is not to be overlooked that some radical leaders do not rise above narrowly selfish and egotistic motivation.[2] And it is equally to be recognized that some intellectuals have been

[1] See, for instance, Ferrer, 'The Origin and Ideals of the Modern School,' 1913, Chapter 1.

[2] Cf., for illustration, Earnest Poole, 'The Harbor,' Chapter 8.

drawn into radical associations and movements not so much by spontaneous sympathy for the working masses as by a chance to escape the boredom of their class and to experience the interest of the novel and perhaps not quite 'respectable.' [1]

In spite of exceptions, however, it remains true that the average social radical is a man of wider, or at least of more intensive, sympathies than is the average well-to-do, contented conservative. The radical knows more from personal experience what the repressed and obstructed desires and interests of the working masses are. He is also in position to have a keener realization of the divergence which exists between social activities and the principles which are supposed to underlie them and to give them ethical support. In the socio-economic field narrowly egoistic interests are not likely to lead to a sincere radicalism, the real radicalism of principle; at most they may lead to the symbolical radicalism resulting from random transference, mentioned above. Social radicalism, while it undoubtedly and quite naturally has an admixture of motive resulting from balked ambition, is mainly the result of balked social sympathy and of reflective impatience with existing social wastes and injustices.

[1] Cf., J. S. Shapiro, 'The Revolutionary Intellectual,' *Atlantic Monthly*, June, 1920, pp. 820–830.

THE CONTROL OF ANOTHER PERSON BY OBSCURE SIGNS

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I

The experiments here reported[1] were upon a young man, a Moravian recently come to San Francisco, known publicly as Eugen de Rubini.[2]

An exhibition of his skill was first observed in private, where perhaps a score of guests were present. There, for nearly two hours, under the direction of various of the guests, he performed feats whose general character was that commonly known as muscle reading, but with an interesting variation. For while, during a brief time of 'warming up,' the subject held in his right hand the one end of a watch-chain of which the other end was held in the left hand of his guide,—the chain hanging usually very slack between their hands,—yet this chain was soon laid aside, and the procedure then was without even this mediate contact between guide and subject.

His success in finding things well hidden and in taking objects chosen in his absence and placing them in strange positions also decided upon in his absence,—feats commonly performed by contact,—led to the present experiments under conditions more favorable to precise control and appraisal. Thanks are due him for his readiness to submit to tests which must have seemed to him tedious and full of vain repetition.

[1] These experiments were planned in conference with Professor Warner Brown and Professor Edward C. Tolman. Dr. Brown, moreover, was present upon all but the last occasion of experimenting; Dr. Tolman was present throughout. The success of the experiments is as much theirs as the writer's, although he only is responsible for the conclusions here presented.

[2] For an account of certain of his European exhibitions, see Frans van Erlevoordt: 'Met den telepaat De Rubini,' *Het Leven*, Amsterdam, **14**, 806 ff., June 24, 1919; Robert Sigerus: 'Der Telepath Eugen de Rubini,' *Zentralblatt für Okkultismus*, **12**, pp. 21 ff. and 74 ff.

Throughout these occasions a protocol was made from lots cast by the guide in private, of the particular action to which he was silently to urge the subject; and immediately after each trial there was recorded the subject's success or failure. And thus until the completion of the trial the guide was the only person who knew the precise choice of action determined by the lots. In Series 1–4 the subject was told immediately after each single trial whether he had succeeded or failed. In Series 5–10, he was told nothing as to the outcome until the end of Series No. 10; while in Series Nos. 11 and 12, he was told at the close of each series. Particular care was taken to avoid positions where any reflection of the guide might be seen by the subject. The guide stood as nearly behind the subject as was possible while still watching the movements of the subject's hand. 'Contact' in the description that follows will mean the use of the slack watch-chain in the manner already described.

During Series 1–4, there were present, besides Dr. Brown, Dr. Tolman and the writer, the subject and his impresario or interpreter (for he himself understands and speaks our language but imperfectly) and Mr. Hillis, a graduate student well known to us. In Series 5–12, the same persons were present, except Mr. Hillis.

No. 1. Guide, S.; contact: The subject, standing before a table on which stood a brass bowl, was told that he would be mentally urged by the guide to deposit this bowl upon one or the other of two seats, to the left and right, respectively;[1] and that the special direction had been determined in each case by lot.

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	R	R	R	L	R	L	R	L	L	R
Direction taken by Subject[2]	*R*	*R*	*R*	*L*	*R*	*L*	*R*	*L*	R	*R*

No. 2. Guide, S.; no contact (except in trials 2 and 3): The subject stood before a table on which was a small vase and, about 15 inches farther from him, two small books, laid side by side. He was told that he might place the vase either upon the right-hand volume or the left, according as the guide mentally urged him.

[1] 'Left' and 'right,' here and throughout, indicate positions relative to the subject.

[2] Symbols in italic type indicate that the subject's action was correct; *i.e.*, corresponded to the intention of the guide.

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	R	L	L	R	R	R	R	L	L	L
Direction taken by Subject	L	R	R	*R*	*R*	L	L	R	R	*L*

No. 3. Guide, S.; mainly with contact (the subject occasionally dropping the chain and proceeding impulsively without it). Ten small volumes of like binding were laid side by side and so spaced that the entire row was about 6 feet long. The subject was told to open, in each trial, but one of the ten volumes, although he might feel and handle, without opening, as many of the volumes as he wished. (The position of the volume is indicated by its number from left to right. They were not numbered for the subject and the guide thought of each by its actual place.)

No. of trial	1	2	3	4	5	6	7	8	9	10
Volume intended by Guide	5	8	3	10	7	8	4	2	8	2
Volume opened by Subject	7	*8*	4	6	6	*8*	*4*	5	*8*	3

No. 4. Guide, T.; mainly with contact. Otherwise the conditions and task were as in Series 3.

No. of trial	1	2	3	4	5	6	7	8	9	10
Volume intended by Guide	8	2	10	8	4	7	2	3	8	4
Volume opened by Subject	6	*2*	9	*8*	*4*	*7*	*2*	*3*	*8*	*4*

The forty experiments of this first occasion give some indication of his skill, but throw little light upon the conditions which influence his skill.

At our second occasion of experimenting it was felt that if, in some of the series, we were careful to prevent the subject from getting help by hearing, his success would show a marked decline; for on the first occasion no special attention was given to the prevention of sounds; at times the subject and the guide were upon a heavy carpet, and again upon a hard uncarpeted floor; the sound of the feet in the two cases was, of course, noticably different. It was also of interest to discover whether the subject was capable of receiving guidance within very narrow, or only within large, differences of place.

No. 5. Guide, S.; with contact; on uncarpeted floor: The subject was required to place a metal bowl to L and R, as in Series No. 1.

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	R	L	L	R	R	R	L	L	R	L
Direction taken by Subject	L	*L*	*L*	*R*	L	*R*	*L*	*L*	*R*	*L*

No. 6. Guide, S.; no contact; otherwise the conditions and task were as in Series No. 5:

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	R	L	L	L	R	R	L	L	R	L
Direction taken by Subject	*R*	R	R	*L*	*R*	L	R	*L*	L	R

No. 7. Guide, S.; no contact: The task, the same as in Series Nos. 5 and 6. The floor covered with rugs; cotton in ears of subject, and with a heavy coating of vaseline outside of the cotton; heavy doubled woollen muffler over nose and mouth of Guide, who was now in stocking feet:

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	L	L	R	R	L	R	L	R	L	L
Direction taken by Subject	R	R	*R*	*R*	R	*R*	*L*	*R*	*L*	*L*

No. 8. Guide, S.; no contact. Task and conditions as in No. 7, except that the guide instead of following directly behind the subject all the while, followed him only to the table from which the bowl was taken by the subject; the guide there remained while the subject proceeded to the one or the other of the chairs upon which he placed the bowl.

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	L	R	R	L	R	L	L	L	L	R
Direction taken by Subject	R	*R*	*R*	*L*	*R*	*L*	*L*	R	*L*	*R*

No. 9. Guide, S.; with contact. Task and conditions as in No. 5.

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	L	L	L	R	L	R	R	L	R	L
Direction taken by Subject	R	*L*	R	*R*	*L*	*R*	*R*	*L*	L	*L*

No. 10. Guide, S.; no contact. Task and conditions as in No. 6.

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	R	R	R	L	L	L	L	L	R	R
Direction taken by Subject	*R*	*R*	*R*	*L*,	*L*	*L*	*L*	R	*R*	*R*

No. 11. Guide, T.; no contact. Floor uncarpeted; no cotton, etc. in ears of subject; no muffler on guide. Ten small wooden match boxes were placed in a row running left and right, and so

spaced that the entire row was about 6 feet long. The subject was told to open, in any one trial, but one box, although he might touch and handle as many of them as he chose. (The numbers of the boxes given below indicate their positions from left to right. The boxes, however, were not visibly numbered and the guide usually thought of each by its actual place.)

No. of trial	1	2	3	4	5	6	7	8	9	10
Box intended by Guide	10	1	7	8	3	6	9	5	4	2
Box opened by Subject	9	3	6	7	4	*6*	5	*5*	3	*2*

No. 12. Guide, T.; no contact. Task and conditions as in No. 11, save that the ten match boxes were now placed in two parallel rows, close together, running left and right, 5 boxes in a row. The space between the rows was reduced to about half an inch, so that the ten boxes made a horizontal rectangle about 5 by 10 inches. (The numbers below indicate positions from left to right: 1–5, in the row farther from the subject; 6–10, in the row nearer him.)

No. of trial	1	2	3	4	5	6	7	8	9	10
Box intended by Guide	8	10	9	5	7	1	6	3	4	2
Box opened by Subject	6	4	5	3	2	7	*6*	1	5	6

The data of the experiments, brought together, are as follows:

No. of Series	No. of Experiments	Outcome to be Expected by Chance		Actual Outcome	
		Successes	Failures	Successes	Failures
1	10	5	5	9	1
2	10	5	5	3	7
3	10	1	9	4	6
4	10	1	9	8	2
5	10	5	5	8	2
6	10	5	5	4	6
7	10	5	5	7	3
8	10	5	5	8	2
9	10	5	5	7	3
10	10	5	5	9	1
11	10	1	9	3	7
12	10	1	9	1	9
Total	120	44	76	71	49

The actual successes are thus seen to be about 1.7 times the number which would reasonably be expected were the subject relying upon pure guess-work.

The indications given by the ratio of successes attained to successes expected by chance are strengthened by the character of the failures. In their size or position these are not such as are most probable by mere coincidence. Such a fact cannot, of course, be detected in those experiments where but one position of erroneous choice is possible, as in Series 1, 2, 5–10, where the subject was limited to two lines of action; and if he went wrong, there could be no differences of degree in his mistake. But wherever different grades of failure are possible, where, for example, the error may have any one of nine different positions, and among these are differences of remoteness from the point of success (as in Series 3, 4, 11, 12) the subject chose, in 19 of the 24 cases of error, a position which, although wrong, was nevertheless nearer to the right place than is the average of all the wrong positions open to him. The subject evidently received from the guide some kind of cue which distinctly and favorably influenced his choice.

Large Versus Small Differences of Direction.—Separating those series where, other things remaining unchanged, there was in the one group of trials a wide spreading of the ten objects, and in the other a bunching of the ten, the following are the facts:

	Outcome Expected by Chance		Actual Outcome	
	Successes	Failures	Successes	Failures
Open order (Series No. 11)	1	9	3	7
Closed order (Series No. 12)	1	9	1	9

The subject appears more successful where the movements open to his choice were widely different in their direction; he was more apt to make a wrong choice among objects close together.

Tentative Choice Versus Final Choice.—The subject repeatedly said that if he could only bring himself to obey his first impulse his success would be greater. The data throw light upon the reliability of this his conviction. For in three series a record was kept—by one of the experimenters other than the guide—of the subject's directions of movement before his final choice. In these series the final choice led to

success in 12 cases, and to failure in 18. If he had, in the same series, followed the impulse which was sufficiently clear to be recorded by the observer, his successes would have been only 8 in number and his failures 22. If in including both successes and failures, we distinguish the failures according as they were more or were less near to success, we find that out of 30 choices the first choice was better than the final choice in 8 cases, and equal to the final choice in 9 cases, and worse than the final choice in 13 cases. The subject's belief that his first impulse was usually better than the one which he finally followed is not supported by the facts. The movement finally approved by him is usually better than that with which he begins.

In seeking for an explanation of his skill, it should be said at once that the subject made no claim to mind-reading in the sense that he could once and for all catch the thought of his guide and, without farther aid, go to the object of which his guide had thought. He needed, he said, to be assisted to the object as would a blind man; there must be by the guide a continual mental correction of his false movements and a corresponding assent and support to the movements that were right; his mind was receptive only to impulsions, and was, so far as possible, inattentive to what the guide might be betraying visibly or by sound; such things disturbed him. Direct observation supported his statement. The experimenters noticed that with his general audience, where they first met him, he several times requested that his guide cease giving certain visible or auditory signs that the subject was going in the right or the wrong direction. And when he was with the experimenters alone, the experiment now following a more reliable method, he gave no appearance of one alert to catch some sign by eye or ear; his eyes were wholly unfurtive; his manner, that of one receptive or dreamy rather than of one who sought to make the most of the externals of his opportunity.

And, farther, the experiments themselves bear out his own account, so far as he denies dependence upon any common or gross sensory signs.

XUM

The muscular and tactual signs, when these were present at all, were of the delicate character made by the very slight differences of tension and contact of a light chain usually quite slack. Yet these slight differences were of marked assistance to the subject. Although the comparison is obviously open to objection, since other differences than the presence or absence of contact enter into the contrasting groups, one may (after eliminating the worst sources of error) roughly say that whereas in the experiments with contact the successes attained are to those expected by chance in the ratio of 2 : 1, in those without contact the ratio is about 3 : 2.

It would also seem reasonable to conclude that, although contact was of assistance to the subject, yet, even without contact, the guide's intention had an effect upon the subject's line of action.

As to the question, what it is that guides him when there is no contact, it would appear that Rubini is not dependent upon hearing. Certain of the experimenters had been confident that he was appreciably helped by the sound of the guide's breathing, and of the lag or alacrity of his footsteps in following, and that with a reduction of these clues there would be a marked reduction in his successes. If anything, there is an increase.

The aids which he might have had from sight were not of a character that would have sufficed for ordinary skill. Throughout the experiments the guide was the only person who knew the position or object which meant success or failure. The other experimenters, when their eyes were directly upon the guide, felt no confidence that they could tell his intention except by his manner *after* the decision had been made by the subject. It seems improbable that the interpreter, who was present in all but the group of supplementary experiments, was able to interpret beforehand the intention of the guide; it seems still less probable that he was able to signal his interpretation to the subject since he was usually well behind the subject, and farther off from the subject than were the rest of us. It seems more reasonable

to believe that the subject caught, in the very periphery of his visual field, something in the posture or motion of the guide, which assisted him. There were occasions when the feet and legs of the guide (when the subject looked down), or the guide's whole body (when the subject suddenly changed the direction of his facing) came into the border of the field of his view. Very conflicting shadows of the guide cast within the subject's field may also have been of help. In those experiments in which he was to take up and place a small brass bowl or a small enameled vase, it is possible that obscure reflections of the guide's posture might have helped; but the brass was tarnished and the vase was made of several variant surfaces. And his method of handling them (which commonly was to 'heft' and swing and rapidly twist the object) made it improbable that he got from these any help. Furthermore, in all the series, four in number, and comprising forty trials, in which books or wooden match boxes were used, such reflections, even the most obscure, were impossible. Direct reflections in windows or glass doors, or in the glass of pictures on the walls were carefully considered in arranging the precise location of the experiment. Since, in an occurrence difficult to explain, one must consider even improbable possibilities, such reflections at certain stages of some of the earlier experiments may have existed. But in the series numbered 5 to 12 the conditions were such as to exclude them entirely.

The fact that the subject was unwilling to be blindfolded may be taken as an indication that he depends to some appreciable extent, even though subconsciously, upon visual cues. The experimenters are not inclined to interpret this reluctance as casting doubt on the subject's *bona fides*. He has been a public exhibitor of his powers in Hungary, Holland and Java; arriving from the Orient, and beginning in San Francisco, he plans to give public exhibitions in America; he is, therefore, justly interested in showing his prowess in its success rather than its failure. His reluctance in regard to blindfolding stands in contrast to his readiness to exclude sounds, an exclusion which proved to be no check upon his

successes. We may therefore assume that in those experiments where he worked without contact, visual cues of a highly elusive kind were of assistance. Tremors of the floor, faint sounds of the guide's movements—of the feet on the floor, of his arms and clothing (though the subject prescribed a fixed position for these, a prescription which we did not always observe), together with those made by changes in his breathing —these were diminished, but not excluded, by our conditions. In using any or all of these, however, there must have been great sensitiveness and great delicacy of subconscious adjustment to give him the proportion of successes attained. The experimenters each and all assume that these successes depended upon sensory cues of some sort, and not upon an immediate influence of mind upon mind. It is hoped that others will supplement the present manifestly incomplete experiments, and lay bare the nature of these sensory cues.

II

Supplementary Experiments

Fortunately it was possible to subject to actual test the conclusions just stated with hesitation. The experiments, as before, were at the home of the writer; and there were present Mr. Rubini, Dr. Tolman, Miss Morrison (our research assistant), and the writer. No interpreter came with him on this occasion; so that the fear that our earlier precautions against the possibility of his signaling might have been insufficient was here set at rest.

In this third group of experiments, Series 13–20, help from shadows and reflections, it is certain, were entirely excluded. A position for the guide and subject was carefully chosen beforehand where with the proper drawing of curtains, all lighting was low and came from the front, and the shadows of the subject were cast well behind him, while those of the guide, who stood behind the subject, were of course still farther to the rear. Pictures under glass that might reflect the guide to the subject were removed. An unglazed piece of pottery was substituted for the brass bowl. Two observers sat well to the rear where their facial expression occasionally

and when no blinders were upon the subject might at most come into the very border of his vision. These 'blinders' consisted of a black bristol-board cylinder, wrapped completely around the head, cutting off the view, not only at the sides, but above and below, leaving a narrow, more or less circular visual field of about 80 degrees. In certain of the series, as will be noted, there was also used an opaque screen reaching to the floor and extending above the guide's head, surrounding him in front and on two sides and placed near the wall at his rear; and in its front was a narrow rectangular aperture just large enough for his two eyes to watch the subject's movements. There was used too a special helmet-like padding to surround and close over the subject's ears previously tight-plugged with cotton. Experiments beforehand showed that by this means the sound of a ticking clock was reduced to about 1/150 of its previous intensity. The guide's mouth and nose were muffled as in Series 7, and he stood in stocking feet on a heavy rug. The protocols in every case were drawn up privately by the guide, were kept in his inside pocket, and were consulted by him only after the subject with the guide behind him was in position to begin the trial; so that no unintended betrayals might come to the subject from the eyes, posture or movement of the guide. In all the Series 13–20, the subject and guide stood or walked on a well-carpeted floor. No chain or other means of contact was used in any of these series; nor was the subject told the outcome of any of them until the end of Series 20.

No. 13. Guide, S.; no contact. Task as in Series 5–10, to place a small piece of pottery in one of two chosen chairs forward and a few paces to left or right. Guide remained upon the spot where he stood at beginning of each trial; *i.e.*, he did not follow the subject when he moved toward the one or the other of the chairs. No blinders, no screen, no special reduction of sound.

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	L	R	R	L	L	R	R	R	R	L
Direction taken by Subject	*L*	*R*	*R*	R	*L*	L	*R*	L	L	R

No. 14. Guide, S.; no contact. Task and conditions as in No. 13, but with blinders on Subject.

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	L	L	L	R	R	R	L	R	R	R
Direction taken by Subject	*L*	R	R	*R*	L	L	*L*	L	*R*	*R*

No. 15. Guide, S.; no contact. Task and conditions as in No. 14, but with high screen surrounding Guide.

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	R	L	L	L	R	L	R	R	R	L
Direction taken by Subject	L	R	R	*L*	*R*	R	L	L	*R*	R

No. 16. Guide, S.; no contact. Task and conditions as in No. 13; but guide dogging the footsteps of the subject.

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	L	R	L	L	L	R	R	L	R	L
Direction taken by Subject	*L*	*R*	*L*	*L*	*L*	*R*	L	*L*	*R*	*L*

No. 17. Guide, S.; no contact. Task and conditions as in No. 16, but with blinders on Subject.

No. of trial	1	2	3	4	5	6	7	8	9	10
Direction intended by Guide	R	R	R	R	L	R	L	L	R	R
Direction taken by Subject	*R*	*R*	L	*R*	R	*R*	*L*	R	*R*	L

No. 18. Guide, T.; no contact. Task, to open the selected one of ten volumes laid in a row, left to right, on a couch before subject. Blinders on subject. Guide followed close behind subject.

No. of trial	1	2	3	4	5	6	7	8	9	10
Volume intended by Guide	3	3	9	8	6	5	6	10	8	2
Volume opened by Subject	8	7	4	*8*	*6*	3	7	*10*	6	1

No. 19. Guide, T.; no contact. Task and conditions as in No. 18.

No. of trial	1	2	3	4	5	6	7	8	9	10
Volume intended by Guide	5	9	7	5	6	10	9	8	7	4
Volume opened by Subject	7	8	6	4	5	9	*9*	*8*	6	2

No. 20. Guide, T.; no contact. Task as in No. 18, but with blinders, ear-plugs and ear-pads on subject. Guide muffled, in stocking feet, and fully screened.

No. of trial	1	2	3	4	5	6	7	8	9	10
Volume intended by Guide	8	3	10	6	4	6	7	2	5	2
Volume opened by Subject	9	6	8	4	1	10	5	9	4	6

The following are, in summary, the data of the original and these additional series, which now bring the total number of experiments to 200:

	No. of Exp's	Outcome to be Expected by Chance		Actual Outcome	
		Successes	Failures	Successes	Failures
Total of Series 1–12.....	120	44	76	71	49
Series No. 13.....	10	5	5	5	5
14.....	10	5	5	5	5
15.....	10	5	5	3	7
16.....	10	5	5	9	1
17.....	10	5	5	6	4
18.....	10	1	9	3	7
19.....	10	1	9	2	8
20.....	10	1	9	0	10
Total of Series 1–20.....	200	72	128	104	96

Assuming, from the evidence earlier adduced, that auditory impressions are of no great importance in Rubini's work, a fairly reliable index of the value to him of visual cues may be obtained through those experiments where the tactual features were constant.

Taking only these, and comparing the series where there were no extraordinary precautions against visual aids with the series in which such precautions were taken, the following appears in summary:

Series without Contact	Outcome to be Expected by Chance		Actual Outcome	
	Successes	Failures	Successes	Failures
Without special precautions against sight: Series 6, 7, 8, 10, 11, 13, 16, (70 trials)[1]	31	39	45	25
With special precautions against sight: Series 14, 15, 17, 18, 19, 20, (60 trials)..	18	42	19	41

From this it is clear that while Rubini can with sight and without the help of touch attain about one and a half times as many successes as chance would give, yet when all visual cues from his guide's behavior are excluded, the

[1] Series 2 and 12 are omitted because of the peculiar nature of the task; the objects of choice were here bunched, and they offered peculiar difficulties.

successes at once drop to the number expected by pure chance.[1]

These supplementary experiments, accordingly, fortify the conclusions suggested by those preceding. It was then felt that Rubini received visual aid from signs unintentionally given him by each of the persons who acted as his guide—signs which indicated whether he was approaching or was going away from the right object. These signs were exceedingly obscure, rarely evident to the experimenters watching the guide; and under the conditions of our latest experiments these signs could not have been given by movements of the shadow of the guide cast forward into the visual field of the subject. The hints seem rather to have come from fleeting glimpses of the guide's changes of place and posture caught in the very margin of vision and perhaps without any conscious intention by the subject to notice or use them. Yet upon these, when touch was excluded, his truly remarkable power seems to depend.

[1] Although the *number* of the failures is nearly what we should expect by guessing, yet when we consider their individual character, they are not what would most probably arise by chance. Confining our attention to the 25 failures in Series 18–20 (where there is the possibility of failures of different value) there are 7 which are farther removed from the correct position than is the average of all the possible choices; while 18 are nearer to success than is this average.

There remains accordingly what some might regard as a 'trace' of evidence that the guide, even with the precautions taken, influenced the subject. Still more careful and numerous experiments would be needed to determine what importance, if any, this 'trace' might have. It is perhaps significant that in Series 20, where both sight and hearing were limited more than in any other series, there were no successes, and the 10 failures have an average value (namely, 2.9 removes from success) but little less than the average value of all possible positions of choice (namely, 3.1 removes from success).